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AUTHOR Swenson, Patricia A. Dickson
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ABSTRACT

This master's thesis examines the Montessori Method as it relates to social learning theory. Much of the subject matter grew out of an attempt to synthesize Montessori methodology and social learning principles in a Montessori school. Chapter I discusses the requirements of quality educational intervention and provides a historical overview of the Montessori movement. Chapter II discusses the theory and proposed implementations of the Method. Chapter III focuses on the Montessori teacher. Chapter IV introduces social learning theory and discusses how the principles of human behavior, as defined through social learning research, might be employed to support spontaneity and freedom in a social learning environment such as the one Montessori envisioned. Chapter V provides a summary and makes recommendations regarding the instructional method and teacher training. Appendices include: (1) a list of Montessori exercises and related aims for practical life, sensorial, mathematics, and language for children aged 2 1/2 - 8 years; (2) sample Montessori exercises in the curriculum areas listed above; (3) a chart relating Montessori exercise components with social learning components, and a flow chart of Montessori training techniques. (Author/RH)

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THE MONTESSORI INTERVENTION MODEL FOR EARLY CHILDHOOD EDUCATION

A THESIS

PRESENTED TO

THE GRADUATE FACULTY OF THE EDUCATION DEPARTMENT

CALIFORNIA LUTHERAN COLLEGE

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARTS IN EDUCATION

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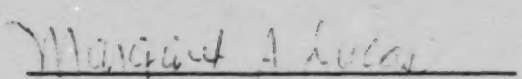
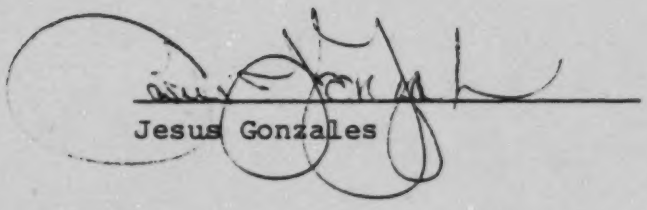


Committee Chairperson
Margaret A. Lucas



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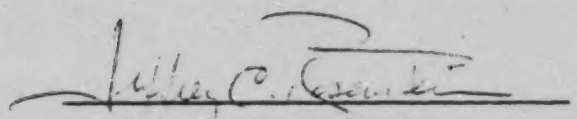

Jeffrey C. Rosenstein

CALIFORNIA LUTHERAN COLLEGE

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CHAPTER I

THE PROBLEM

Introduction

Montessori theory, often at variance with the beliefs which dictated the actions of educators early in this century, now enjoys some support from the work of researchers. However, many individuals both inside and outside of the Montessori Community are unaware of this support. This lack of knowledge has created disinterest among non-Montessorians who have had limited access to any information about the Montessori Method. It has also created defensiveness among Montessorians who hold, then, even more tightly to the traditions of the past. They are hesitant to seek new information which might indicate the necessity for changes to a long-protected legacy. This situation inhibits a healthy interaction between Montessori educators and the larger educational community which could provide needed resources to both.

The Montessori Method appears to offer an intervention model worthy of more careful evaluation. It is a method theoretically consistent with life in the larger community where individuals are required to behave responsibly and helpfully toward themselves and toward others as they seek, acquire, and use the world's available resources. The Montessori child learns these appropriate behavior patterns in a practice arena, the Montessori environment. This

environment is a microcosm of the larger world, a social learning environment. The results of the practice are consciously and continually observed, evaluated, and modified as necessary--by the child--with the help of a teacher who must both model and facilitate the processes for optimum learning interactions within the environment of the practice arena. In a social learning setting, models and observers continuously interact with each other; thus observational learning is constantly occurring. Therefore, it is of crucial importance that knowledge about the casual relationships that influence observational learning become a part of the teacher's application of the Montessori Method. A consistent application of this knowledge within each and across all Montessori environments would provide an observable consistency within the practiced method. This might, in turn, provide greater confidence for educators within the Montessori Community. Both consistency and confidence might result in a new invitation to non-Montessori educators to examine more carefully the potential of the Montessori Method. The interaction thus facilitated could initiate greater sharing of resources between and within both groups of educators.

Montessori provided material models for the process of observational learning and required that a child be free to spontaneously interact with and be responsible for the care and sharing of these models--much as he/she would be required to behave with resources in the world outside the classroom.

The human support mechanisms for this spontaneous interaction, however, were ambiguously described by Montessori. This has led to various interpretations of the method by practicing Montessorians and consequently by outside observers. The Montessori teacher's role is often inconsistently performed within a specific environment and across environments. The ensuing confusion about what the method really is makes the Montessori Method unattractive to outsiders who might otherwise consider its potential.

Rationale

There is a need to call to the attention of both Montessori and non-Montessori educators the necessity for a more careful analysis of the potential of the Montessori Method. The author believes that such an analysis would stimulate interest in the method. It would also provide a base for exploring the compatibility between the Montessori Method and Social Learning Theory and for attending to the implications of social learning research for the teacher role in the social learning context which defines the Montessori environment.

Statement of Purpose

The purpose of this thesis is to examine the implications of social learning research as applied to the Montessori teacher role model and to provide a dissemination vehicle which will present this information to both

Montessori and non-Montessori educators.

Delimitations

1. This work is an examination of the Montessori Method as it relates to Social Learning Theory.

2. In addition to the primary sources from which information is drawn, secondary sources are utilized because of the clarification of the method they are able to provide. These sources are necessary and helpful inasmuch as the works of Montessori as published in the English language are repetitious and often lacking in organization and clarity.

3. The primary aim of presenting information about the Montessori Method is that of facilitating the reader's understanding of the theory and methodology to an extent sufficient to provide a base for understanding the application of social learning theory to the teacher role model. Therefore, Montessori's theories in such areas as anthropology, cosmology, and theology are not examined.

4. Chapter II, "Review of the Literature," in this thesis is integrated in Chapter IV.

5. The terms listed under "Definition of Terms," Chapter I, and in Appendix A are defined as they are used by the author.

6. Though the author reviewed some 450 books, articles, and abstracts, a complete bibliography is not a part of this

thesis. Only works specifically referred to in the text are included on the "Reference" list.

Definition of Terms

causal relationships - the components of social interactions which influence an observer to ignore, to imitate, or to save for later use the actions of a model.

facilitator - one who insures the success of a learner.

intervention - an intentional, goal-directed interaction which may be initiated by the student or by the teacher.

model - a learning resource, material or human, physically or symbolically present to an observer, which or who demonstrates a concept or a process.

Montessori Community - those individuals who work and serve within the schools and organizations established to protect and support the work of Maria Montessori, or who, based on selected criteria other than such affiliation, call themselves "Montessorians."

Montessori environment - a social learning environment which provides the child with needed resources for physical, intellectual, and social growth and development.

Montessori Intervention Model for Early Childhood Education - the Montessori Method combined with Social Learning Theory principles as these relate to strengthening the role of the teacher.

Montessori Method - a method of education facilitative of self-preparation for life which fully defines a structure for curriculum and environment as these relate to the needs of the developing child.

observational learning - observation of the behavior of other human beings which results in either ignoring, acquiring, or imitating the observed behavior, contingent upon perceived consequences to the model and the observer; may also be called "social learning."

observer - one who attends to the actions of a model.

social learning environment - any situation, accidental or intentional, in which a human being interacts with material or human models; the intentional context of the Montessori environment.

social learning theory - a practice which isolates, defines, applies, and continues to research the antecedent, process, and consequence components of behavior which reciprocally influence the formation and modification of human behavior within and across social interactions.

spontaneous interaction - the right of the child in the Montessori environment to select and follow through on an activity in a responsible manner without negative physical or psychological consequences.

A glossary of additional terms may be found in Appendix A.

CHAPTER III

PROCEDURES

This work was undertaken to stimulate greater inquiry into Montessori theory and methodology by Montessori and non-Montessori educators and to rationalize the need for the behavior of Montessori teachers to be directed in accordance with knowledge of the principles of human behavior as they relate to the social learning context of the Montessori environment. The author's own inquiry into Montessori theory and methodology began four years ago with a search for an appropriate early learning environment for her two-year-old son. The search led to the selection of a Montessori environment and subsequent enrollment of the author in a Montessori teacher training course. This experience stimulated interests which resulted in admission to a graduate program in early childhood education and an M.A.E. degree. Two areas of interest expanded for the author in the years of these involvements: an ever-growing interest in the Montessori Method and an enlarging conceptualization of its compatibility with Social Learning Theory. Hence, this thesis endeavors to highlight for other educators the process of that interest and to share some aspects of that compatibility.

A working bibliography for the survey of research and popular literature on Montessori was obtained from a Bibliographic Retrieval Systems off-line computer print-out of

references from 1968-1978 in ERIC and Psychological Abstracts. This print-out was obtained through the research librarian at The University of California Santa Barbara. Resources identified were then obtained from the California Lutheran College Library and through its inter-library loan capabilities as well as from the libraries at The University of California Santa Barbara and at California State University Northridge. Some of the books and articles cited were purchased from The American Montessori Society and the National Center for Montessori Education. Several articles and studies were located through contact with their authors by letter or telephone. Two resources were obtained through correspondence with the National Library of Congress. Acquaintance with these resources led to older books and articles on the Montessori Method which were subsequently obtained in the same manner. Other information about the Montessori Method was obtained through correspondence with the American Montessori Society, the Association Montessori Internationale, the International Association of Progressive Montessorians, six training program directors in the United States, and several individuals involved with the Montessori Community. Conversations with Montessori and non-Montessori educators also provided valuable resources regarding perceptions of the method, as did conversations with parents whose children attended Montessori schools and whose children attended other early learning alternatives. The author spent

in excess of two hundred hours observing in both Montessori and non-Montessori environments. The author's development of and administration and teaching in her own school also formed an integral part of this process. This school was a first attempt at synthesizing Montessori methodology and social learning principles.

A working bibliography for surveying the research on social learning was taken from Bandura's (1977) recent book, Social Learning Theory. Contact with additional resources was provided when the author took a course in Social Learning Theory. Reviews of these resources provided access to related literature. Resources were obtained from the libraries referred to above and from the personal library of the author's spouse. Because of the high number (450) of bibliographic items generated by this search, the references documented in this thesis are confined to those specifically referred to in the text.

The more personal history of the process of the author's interest in Montessori matters is detailed in Chapter IV, "The Montessori Intervention Model for Early Childhood Education." Chapter IV is divided into a "Foreword" and five sub-chapters. Chapter 1 discusses a context for consideration of the Montessori Method. Chapter 2 introduces the reader to the Montessori Method. Chapter 3 discusses the Montessori teacher. Chapter 4 introduces Social Learning

Theory and discusses its potential application in the Montessori setting. Chapter 5 (which is Chapter V of the thesis) provides a summary and makes recommendations regarding the Montessori Method and Montessori teacher training.

CHAPTER IV

THE MONTESSORI INTERVENTION MODEL FOR EARLY CHILDHOOD EDUCATION

In the opportune quality and in the manner of this intervention lies the personal art of the educator (Montessori, 1964, p. 176).

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Foreword

There is that quality of art called "universal" by the community of beholders which attempts to understand and interpret what it is that artists have done and do. Universality describes the fact that a work of art strikes a respondent positive note in the experience of the beholder. The degree of universality corresponds positively with the number of such notes sounded within and across individuals. The striking of a harmonious chord results in the assignation of value to a particular work of art which then becomes a model deemed worthy of emulation without further evaluation. Unfortunately, the cacophany produced by a discordant response creates aversion or spawns criticism which usually overrides any amount of value a work does contain. This occurrence precludes any identification of strengths which, by their very acknowledgment, might prove catalytic of constructive change. Responses like these, black and white, as it were, facilitate the origin of opinions which practice themselves into rules which are difficult, if not impossible, to change. This is the kind of reacting that has resulted from the majority of encounters with Montessori methodology: individuals are appreciative of the Montessori educational model, or they are unappreciative. If there are any in the neutral zone, they are not visible. The tragedy would not be as great if both positive and negative opinions were based on information that might provide adequate support for them.

My first encounters with the Montessori Method created both harmonious and discordant responses. The process which resulted spanned a period of years filled with attempts to clarify this ambiguity. It was concern for a quality pre-school experience for our youngest son which began my examination of educational environments for young children. After considering various alternatives, my husband and I selected a Montessori school for our two-and-one-half-year-old. As a result of my own investigations and of our son's successful experiences in the Montessori environment, I enrolled in a one-year training program to become a Montessori teacher. Five months into the program I withdrew, because the program, despite catalog descriptions of courses in psychology, philosophy, and child development (to name some) spent over 90% of its three-hour per day, four-day per week training program on the Montessori didactic materials. Only one session in fifteen was spent on other components of the method. It was also required that many hours outside of class be spent typing the exercises for the use of the didactic materials and placing them in apparatus books too cumbersome to be manipulated. I had two volumes each for Practical Life, Sensorial, Language, and Mathematics exercises.* I now have a set of files with each exercise in its own folder--and much additional material on variations (same level of difficulty) and extensions (increased difficulty) of the exercises. The remaining small portion of the training time was devoted to

*Appendix B lists the exercises included and their aims.

philosophy, psychology, and several Saturday-morning workshops presenting some of the Montessori materials for science and history. Philosophy consisted of outlining and discussing Montessori's The Absorbent Mind. Psychology consisted of one session outlining Piaget's theory of child development and some correlations of this with Montessori theory and another session on classroom discipline. My contact with my husband's (Ph.D.) teaching and research in Clinical Psychology and my own educational experiences and guided reading (not to mention rearing two of our three children into non-rebellious teen years) made me well aware of how poorly equipped the trainees from this program would be to defend Montessori philosophy or to manage their classrooms. I was seeking something more complete.

Though I withdrew from the training program, I was still very interested in Montessori theory and methodology. I kept reading everything by and about Montessori that I could locate (and am still locating) that is available in the English language.

Involvement with background work for establishing a child care center at a private liberal arts college for the use of children of non-traditional students led me to explore a wider range of alternative models for preschool child care and education. Soon after this, my entrance into a Master of Arts in Education degree program, with a specialization in early childhood education, provided an even wider range of

alternatives within developmental studies and education. Concurrently I explored in greater depth the philosophy and implementation of the Montessori Method and became acquainted with much of the research which has been directed at assessing this method of education.

During this time I also developed, administered, and taught in my own preschool, Dos Casas (two houses). The model selected was Montessori-based because of Montessori's total individualization of instruction and the responsibility placed on the child to initiate interactions with the resources in the environment and to be responsible for caring for the materials and the surroundings. The stated goals for Dos Casas reflected my perception of the social learning environment defined by Montessori:

> For a child to experience growth in his or her capacity to function independently within the environment by observing teacher and peer models, making choices, solving problems, and modeling for others; and
>
> for the teacher to facilitate the growth of this capacity in each child by observing children's behavior and modeling and verbalizing appropriate behaviors in relationship to the physical environment and its resources and the social interactions within it.

Also during this time, I made an in-depth study of Social Learning Theory which, combined with my other experiences, led me to conclude that it could be of invaluable assistance to educators who favor models of intervention supportive of the freedom and spontaneity sought in the Montessori Method:

Social Learning Theory provides a framework for the behavior needed to support verbal claims of freedom.

I am convinced that, at its best, the Montessori theory and system of education provides, among other strengths, a way to educate individuals to become self-motivated, self-directed, responsible, and altruistic human beings.

I have become aware, in the course of my research and the shapes of my interactions with educators of the Montessori persuasion and those outside of it, that a barrier exists between the two. I have become equally aware that a sharing between the two communities would be of benefit to children and to those who serve them.

This book, then, is the sharing of my learning process. I share it because in the Montessori Intervention Model for Early Childhood Education I see answers to questions raised but not answered by educators. I share it because I see questions to answers deemed sacred and permanent by Montessorians. I share it, more than for any other reason, because my search has drawn me to see that it is the teacher on whom the Montessori Method depends, and it is the teacher's needs that are left unmet by the method--as Montessori developed it and as it is currently practiced.

Though I agree with A. S. Neill's statement that

> We all go through stages of discipleship, but if we do not come out of it, we are inferior. A wise man does not label himself Montessorian,

> Steinerite, Deweyite, Summerhillian; to do so is to look backward (Snitzer, 1972, p. 13),

I also know that crouching down and looking backward often provides a springing position which facilitates forward motion. Further, using names can expedite understanding provided that the content which the name defines is explicated. It is the task of this book to crouch and look, to explicate, and to provide some impetus for forward motion. Chapter 1 is a looking back and a looking now at history and needs as they shape and request a quality intervention for educating young children. Chapter 2 introduces the reader to the theory and proposed implementations of the Montessori Method. Chapter 3 discusses the Montessori teacher. Chapter 4 introduces Social Learning Theory and discusses how the principles of human behavior, as defined through social learning research, might be employed in a social learning environment such as the one Montessori envisioned to support the spontaneity and freedom required. In other words, it offers an invitation for more educators to become accomplished technicians in the application of their art. Chapter 5, which is Chapter V of the thesis, provides a summary and makes recommendations regarding the Montessori Method and Montessori teacher training.

It is my wish that this work be received with the kind of ambiguity which fathered its conception.

have demonstrated that younger children (under about age seven) need to be physically engaged with stimuli in order to attend to them.

Support for Montessori's observation about sensitive periods in the developing child--evidenced by a child's intense and repetitive practice with specific features or tools of the environment until a particular skill or ability is perfected--has been posited by Elkind (1976) who feels that his work with ascendancy is significant in supporting a theory of periods of sensitivity. His examinations of children's visual patterns have shown that when a child is first learning to read, left to right visual patterns dominate all looking. Once reading is mastered, other patterns can dominate. Further, he agrees with Montessori that "when an ability is in the process of formation, a child prefers materials that nourish the growth of that activity" (p. 174).

Education: Supermarkets, Needs, and Values

Though today's society has not taken upon itself the tremendous responsibilities and challenges that would be indicated if attendance in schools were to be a matter of free choice and non-attendance not punishable by law, more educational alternatives are being considered and adopted. The variety of alternatives is, of course, larger for those who choose to support private alternatives in addition to paying taxes to support public endeavors. Though program variety appears to be growing in the public realm, most children are

still relegated to attend a particular program within a particular boundary even though superior programs might be deemed to exist elsewhere within the same district. As potential alternatives become more numerous and the quantity of materials for education increases, communities of administrators, teachers, and parents find themselves with a supermarket full of choices and few criteria for making them. And, unlike appliances and automobiles which at least accumulate some sort of servicing record before their retirement, educational components are purchased, tried for a while, and lost to obsolescence without any real knowledge of what their potential contribution to education as a whole might have been if attempts had been made to evaluate and then refine one or two to perfection. McDermott (1965) claimed

> we must demand that innovations no matter how capable of solving individual learning problems, must prove themselves within the total fabric of learning. This is an awareness that should characterize the schools and, for that matter, the whole of the human situation. (p. xviii)

Parker (1975), also concerned about the overflowing supermarket out there, identified a set of needs which should be addressed:

1. A need for a theory of child development--to build theories, not just resurrect them.
2. A need for the funding of research synthesizers to gather and disseminate information to professionals.
3. A need for a universal set of objectives.

4. A need for breaking programs into components to evaluate and analyze them and apply them effectively to objectives.
5. The need for real evaluation--not just standardized tests but instruments that measure trust, etc.
6. A need to not make assumptions about cognitive development.
7. Instructional materials should be catalogued--all that there are--and described and evaluated.
8. Staff development is a must--competencies should be identified and a relationship established between staff competencies and child outcome. There should be TV programs to train parents and adults.
9. There is a lack of adequate programs. Twelve outstanding programs should be chosen for study.

There have been fragmented attempts to address some of these needs. But problems are encountered in the political and economic structures through which solutions must filter, if and when they are discovered. Further fragmentation occurs in the demand for local autonomy in educational decisions. "Needs" are interpreted through the rose of locally-colored glasses not hued in to concerns of a larger world which, though it physically grows smaller, finds itself populated with an ever-growing number of isolated islands in which many people maintain cloistered existences.

And, meanwhile, the costs of our trial and discard approaches keep escalating. As Culverwell (1914, p. xiv) stated, "Methods so wasteful as those we employ in education

are only tolerated when they are time-honoured." It is not just the methods which are wasteful. The costs of abuses visited on children by such trial and error procedures cannot be estimated.

Recent talk of vouchers as an alternative which might allow more freedom of choice to those who pay their dollars for the costs of education scares--no, terrifies--those within the public-serving educational community:

> In addition to this crisis (cutting back of funds) another is looming on the horizon. If the proposed referendum for a Voucher System should succeed and then be passed by the voters, this would mean the end of public education in California as we know it. All of the child care, child development and kindergarten primary programs to which we devote our energy would be drastically altered. (Nolan, 1979, p. 2)

And talk of raising taxes to allow the freedom of more choices to school officials is no longer supported by any action of the taxpaying voters.

Despite recognition of the need for preschool education, public funding covers the enrollment costs of only 35% of preschoolers enrolled in educational programs (Jennings, 1979).

And, of course, one can complicate the foregoing mix by throwing in explosive issues like bussing. Instead of a healthy climate which might propagate positive alternative solution, there is instead a self-protecting climate where each faction tries to hang on tenaciously to what it thinks it already posses. "Adult man on whom every appeal is wasted . . .

economically insecure, remains bewildered in the maelstrom of conflicting ideas and throws himself now on this side, now on that" (Montessori, Note 1).

Despite the growing frustrations of education as they are reported today, we are still, apparently, a nation which values knowledge. A recent report (Jennings, 1979) indicated that between 1970 and 1976

> the number of children attending preprimary programs (nursery school and kindergarten) increased 18 percent--even though the number of total children ages 3-5 years decreased 11 percent during the same time. (p. 19)

Before the temptation to blame this on the liberation of the working mother provides the impetus to do so, it should be noted that there is a direct positive correlation between this growing number of early education enrollees and the level of education of the mother. We still affirm the acclamation of Thomas Jefferson, acknowledged by this country to be the Father of Education, that people must be educated to be free.

It seems that in education today, there is an overwhelming effort to bring the whole world into the classroom. Maybe this is a partial response to the alienation from the mainstream of society that has been the growing experience of "schooling." Or perhaps it is just impossible to choose what to leave out. Maria Montessori was not interested in constructing a world within a classroom. She was interested in "preparation for life"--in aiding the child in refining skills

and articulating those processes which would allow him or her to go into the world prepared to function as master or mistress of and positive contributor to that environment which supported daily life.

There are problems in education, then, in terms of selecting appropriate goals and choosing the right methods and materials, based on children's needs and supported by empirical data, to reach them. "The exciting aspect of Montessori's revolution in education is that, taken as a point of departure, it does not involve the creation of a parallel and totally different social structure" (McDermott, 1965, p. xxv).

Justifying the Montessori Opportunity

To show that the Montessori experiment was worth making, to show that it was bound to be made by others, and to help in making clear the principles on which it should be made, Culverwell (1913) wrote The Montessori Principles and Practice. His final word was:

> Here, as in all things educational, we must preserve a temperate judgement, for the proof of the pudding is in the eating. And since we cannot eat the pudding before it is cooked, all that discussion can be expected to do for a new experiment is to enable us to judge whether it is worth trying, and if we so decide, to enable us to experiment with a clear knowledge of what we are about to do. (pp. 301-302)

In 1923, Nunn wrote:

> The little students acquire, it is claimed, a high degree of initiative, self-reliance and

> power of concentration; they learn self-respect at the same time as a respect for others and develop a habit of serious, purposeful industry rarely shown by children driven abreast along the road of progress in accordance with the traditional method of class instruction.... good evidence that these children are much severer taskmasters to themselves than their teachers would dare to be--and that in arithmetic, reading, and composition they reach standards as high as, and generally higher than those expected for their age. (pp. 90-91)

Sixty years after Culverwell, there is still uncooked pudding. Fifty years after Nunn, Brophy and Choquette (Note 6) articulated what is a continuing problem confronted by those seeking to prove the claimed virtues of the Montessori Method. Several proponents have boosted the method in popular books, Brophy and Choquette point out, but without presenting data to back their claims. The claims are still in the language that Nunn used: "it is claimed" and "good evidence exists." Supporters' evidence is rendered anecdotally and emotionally--following the style with which Montessori herself reported her findings.

Though there is a growing body of early childhood research which appears to support some of Montessori's basic foundations, little significant research has been done on the effects of the applied method.

My own experience in attempting to verify some of the claims of those utilizing Montessori methodology is worth recounting, because it exemplifies the problem of access referred to earlier. I, too, had read claims about the outcomes

of this method of education. As the mother of a preschooler who was looking for a quality experience for her son, it was important to me to find some backing for these claims. I found that what little is known about Montessori in any hard-data fashion is scattered through various professional journals in education and psychology or resides in a handful of government documents. None of this data is readily available to the lay person--or even to the Montessori teacher trainee whose training time is not oriented to library research. I queried the administrator of a Montessori school and a Montessori teacher training institute and two of the teacher trainers at the institute as to what they knew about research that had been done on the Montessori Method. They were unable to direct me to a single study, though among the books on sale at the institute I found several references to studies and the names of a few individuals or organizations with whom I might communicate to find out more. Of those to whom I wrote, some did not answer; others indicated that they might share their knowledge with me if I wished to enter their training programs. Still others were supportive and shared the little they had found, encouraging me to find more. Three years after these weak but initial sparks of light, I had a Bibliographic Retrieval Systems off-line computer printout sent to me which listed 228 ERIC and Psychological Abstract citations on "Montessori." These citations are comprised of research on some aspect of the method or on modifications or incorporations

of it into other programs as well as a large number of articles and a few books not aimed at giving empirical data on the method's use. A cursory review of the data supplied in the abstracts and an in-depth review of a number of studies selected for review because they focused on measuring the Montessori Method as applied without modifications indicates that there are not always outcomes consistent with claims. A number indicate, as research on other pre-school experiences indicates, that early gains shown in preschool environments do not hold up after several years of public schooling. There is also verification in the Montessori research, as in other pre-school program research, that, compared to no preschool experience, almost any preschool educational experience has some degree of positive impact for culturally disadvantaged children. With Montessori or any other method of early childhood education, it appears that researchers are still experiencing difficulty in isolating measurable dimensions and their interactions via statistical techniques. Klein (1973, p. 10) stated:

> In determining the dimensions needed to describe preschool programs, it is important to distinguish questions concerning differences between programs from interrelations among the variables within a program. This suggests that it is very unlikely that statistical techniques alone can determine a set of dimensions in terms of which all programs can be described because dimensions describing differences between programs may not be the same as dimensions describing differences between children within a program.

It would seem that much could be gained if individuals both inside and outside the Montessori community could work together on the challenges that exist in the area of research. I would venture to say that an irony exists in that most of the research that supports Montessori's principles or has attempted to study some aspect of the method has come from outside the Montessori community. I say irony because, though Montessori was first and foremost a scientist and a researcher, training programs for teachers do not, by and large, teach research skills to those who go forth to experiment with the young.

J. McV. Hunt (1964) stated that "the method lacks heuristic power--it is deficient as a provoquer of research desirable to help resolve issues borne of the method itself" (Evans, 1971, p. 48). With all due respect to Dr. Hunt, I would say that it is not the Montessori Method which lacks heuristic power. If indeed there are "issues borne of the method itself" which require resolution, then perhaps it is the individuals most closely involved with the method who lack heuristic qualities. When one receives materials from Montessori schools or training programs or any of the various organizations which support the method nationally or internationally, implicit in them all is that this is "the way;" there is no attempt made to prove it; there is no question raised about it. As Kramer (1976, p. 378) wrote, "Nothing is as inimical to the pursuit of truth as the conviction that one has already found it."

As Montessori (1964) noted, observers are not created by the command "observe," but "by giving the power and the means for this observation" (pp. 228-229). Though Montessori provided the "place"--the opportunity--she did not, as will be discussed later, empower her followers by giving them means.

I would say, in response to Mr. Culverwell's culinary analogy repeated in the first paragraph of this section, that the pudding has been supped at repeatedly because those who have dined thereof have, to all intents and purposes, considered it cooked. The only "proof" that has emerged is that it is palatable.

If the Montessori Method is to have any far-reaching impact on the current educational scene then, in addition to the testimony of its believers, the longevity and wide applicability record it is accumulating, and the theoretical advantages which excite those who know them, it must clarify its principles and their implementations in terms of environment, materials, and teacher behavior. Then it must reiterate its goals and produce empirical data to show that these principles implemented in these particular ways will reach the goals specified. And if, in the course of producing such data there is demonstrated a flaw or two in the method, then there must be resultant refinements of the method. After all, that was what Montessori stood for. The liberty upon which she based her method was both a responsive and a responsible one:

> It is liberty that makes it possible for us to pursue experimental investigations, without fear that our brains may become sterile. And by liberty we mean readiness to accept new concepts whenever experience proves to us that they are better and closer to the truth we are seeking. (Montessori, 1913, pp. 22-23)

And, of course, the responsibility to behave with this kind of liberty in mind is no less incumbent on the non-Montessori community.

CHAPTER 1

THE SHAPING OF AN OPPORTUNITY: HISTORY AND NEEDS

Opportunity and Manner: Contrived Art

The art of a quality educational intervention is like any other form of highest art: when adequately contrived by the artist, it is representative of real life and hence meaningful to those who participate in its results either first hand or vicariously.

This book discusses a two-fold art that defines quality educational interventions. There must first be the opportunity by way of an environment constructed to meet the needs of the developing human being for appropriate resources and appropriate spaces in which to use them. Second, there must be a manner of facilitating successful interactions of the individual with this environment. The opportunity which Maria Montessori contrived provides a responsible blueprint for meeting the needs of children. There is support available for this opinion. The manner which she described is not equal to the tasks demanded of it. There is also support available for this opinion; but, more importantly, there is a way of strengthening the manner to meet the tasks Montessori intended for it. To say this in the language of the first paragraph, Montessori has contrived the opportunity; the manner needs to be more fully contrived.

Perhaps the use of the word "contrived" causes some

discomfort. Modern-day connotations of the word include a sinister element of negatively plotting or scheming. The definition I am thinking of is something like the following:

> To fabricate as a work of art or ingenuity; design; invent; to bring about or effect, as by ingenuity or stratagem; to manage by intention.

The most beautifully and completely contrived environment does not provide a guarantee that a quality education will result, just as the hereditary endowment of a genius intellect does not guarantee that that genius will be developed.

Environment: A Perspective

Human beings have constructed their environments for such a long period of time now that to speak of rearranging environments in purposeful ways seems to many to constitute tampering with divine nature itself. A reminder is necessary that human beings have always modified environments by their very presence if not by intention. "At birth a child does not enter into a natural environment but into one that has already been extensively modified by men" (Montessori, 1966, p. 21).

Advances in science have been responsible for many of the changes in the physical arrangements supportive of human existence. In the case of early human development, these changes have resulted in a decrease in infant mortality and a healthier early existence because of closer attention to the clothing, feeding, and quality of environments for young children as they relate to the physiological needs of early life. Children have

always been clothed, fed, and housed, but "the point is, that the same physical acts which performed blindly and without order, led to disease and death, when ordered rationally were the means of giving strength and life" (Montessori, 1965a, p. 29). Certainly if a newborn of today were to be denied adequate physical care, indignation would rise and accusations of child abuse would be made. Ignorance is no longer an accepted excuse for losing human potential through physical neglect. On the contrary, such abuse is punishable by law.

Years of involvement with Head Start and other programs aimed at reorienting the behavior of culturally disadvantaged or physically or intellectually handicapped individuals should by now, at least, have made an impression of the obstacles to the development of human potential caused by inappropriate environments. As Montessori wrote in a letter addressed to all governments in 1947, "Childhood constructs with what it finds. If the material is poor, the construction is also poor. In order to build himself, he has to take by chance, whatever he finds in the environment" (Montessori, Note 1). Considering the number of environments that are funded and activated in an attempt to reverse the damaging effects of inappropriate environments, we echo the faith that Montessori placed in the environment: from the environment "the cure will come" (Montessori, 1963, p. 87). Yet, the cure record is far from impressive and optimum environments have still to be identified. Ignorance is still accepted as a plausible explanation for

failure--perhaps, in part, because optimum environments must grow out of goals which, themselves, are in need of clarification. And perhaps ignorance is accepted as an excuse also because intentions are positive even though results are often not. Seldom do parents or societies purposely create environments to damage their young. But how long, I wonder, will intention be the focal point? The "accountability" movement of recent years has begun to alter perspective. The focus swings more to the results end of the spectrum in such instances as the three million dollar lawsuit now pending before the courts of the State of Michigan. This suit is based on damages to the life of a fifty-two-year-old man who, at birth, was committed "accidentally" to expend his existence housed in a mental institution. Certainly this accident was not intended. In trying to explain how it happened, officials claimed that in the 1920's knowledge was such that those in charge believed that an insane and institutionalized mother's institution-born child must, of course, be insane and needful of institutionalization. Only recently has the concept of accountability begun to result in legislation that would require evaluation of the results of intentions. The man in the Michigan case, now evaluated as "normal," most likely will never be able to develop his full potential because of the time and the opportunities of which he has been deprived through being forced to live in that particular environment.

Not the least important feature of the Michigan case is

the highlighting it provides for the importance of environment.

Maria Montessori began her shaping of environments for human learning when she worked with institutionalized retarded children. The overwhelming response of the children to her techniques led her to wonder how influential it might be if applied to normal children. Her experiences with that application have resulted in what is known of the Montessori Method today.

Something Old: Something New

Almost seven centuries ago, Dante, the Italian poet, wrote his Inferno. Of particular interest within this work of art was the quality of the relationship between the poet and his guide. The compassionate guide sensed the needs of the poet, and his method of leading was based upon those needs. His manner of leading was divinely inspired and utilized all the talents with which he had been endowed. He chose appropriate times and places for his teaching. He had no doubt about the correctness of taking an active, or guiding, role. The poet's learning was through his own life experiences and through observation of his guide who demonstrated that he, too, was still a learner and an observer. Comfort, encouragement, and protection were available from the sensitive guide even when the poet was unable to articulate felt needs for them. The poet worshipped his guide. The outcome of this relation-

ship was that the poet arrived at a point where he could leave his external guide behind and be responsible for his own life, because he had an internal guide (or model) which provided direction for his actions: the perfection of Beatrice.

Five hundred and forty-nine years after Dante's death, another Italian destined for world acknowledgment was born. The work of art of her lifetime, the Montessori Method of education, described as a revolution in education (Standing, 1966), was based upon the needs of the child. Like the guide of the poet, Maria Montessori was a compassionate and inspired individual. She approached children with great reverence and humility. She attuned herself to the child's preparation for life. It was her belief that involvement with real life experiences provided the only means for a human being to develop independence. Children loved her as their teacher and many adults came to follow her instructions for teaching young children as though the Montessori formulae were sacred.

Montessori's own non-traditional role--she was the first female medical doctor in Italy, a spokesperson for the liberation of women long before such a liberation could be called a movement, and certainly outnumbered by the males in the educational world of her day (Kramer, 1976)--perhaps led her to explore a wider range of potential teacher/learner relationships for the facilitation of human independence. At any rate, her method of education accorded vastly different roles to both teacher and learner than those which tradition had

bestowed. The guide's task was to provide an environment with self-instructing, self-correcting material motives for activity and then to observe the learner whose task was to interact with this "prepared environment" and gain mastery over it. Montessori's radical approach declared that education was no longer something that the teacher did but was--and to be successful must be--solely the child's task.

> Education is not something which the teacher does, but . . . it is a natural process which develops spontaneously in the human being. It is not acquired by listening to words, but in virtue of experiences in which the child acts on his environment. The teacher's task is not to talk, but to prepare and arrange a series of motives for cultural activity in a special environment made for the child. (Montessori, 1967a, p. 8)

McDermott (1965) points out that in the American tradition there is a great gap between sophisticated learning theory and actual classroom practice. He states that it is Montessori, above all others, who holds to the entwining of empirical method, scientific data, and human aspirations--especially as they are found in the child's world--as the irreducible elements in any theory of education. "In this situation it seems reasonable to study anew the liberal and seminal side of Montessori's thought for its relevance . . . to the broader needs of early childhood education" (McDermott, 1965, p. xiii).

Beginnings of the New

On January 6, 1907, at the opening ceremony of Montessori's first children's house, she said, "As yet I had no special

system of instruction" (Montessori, 1966, p. 113). Almost three-quarters of a century have passed since the experimental beginning of Montessori's "crusade for childhood" and her first children's house in the slums of Rome. During the first two quarters of this century, until her death in 1952, Montessori worked at building her system of instruction. Also during this time period--and with an even greater emphasis in the current quarter of the century--the world's spotlight on children has brightened. In its light the human being's movement through the years of early childhood has become better understood. This understanding has been translated into laws "freeing" the child from physical abuses. It has also been translated into recognition of the need for earlier formal education.

Three themes have dominated this early history of educating young children (Austin, 1976, p. 334):

1. education is the answer to social reform;
2. the quality of later development is linked to early developmental experiences; and
3. early learning will have an impact on later schooling.

Maria Montessori harmonized with all these themes. She firmly believed that early education was the answer to social reform:

> If statesmen and educationists once came to realize the terrific force that is in childhood for good or for evil, I feel they would give it priority above everything else. All problems of humanity depend on man himself; if man is disregarded in his construction, the problems will never be solved. (Montessori, Note 1)

Her experiences with education and humanity were refined by the impact of two world wars which only served to intensify her belief that educating the human being to potential by starting the process at the beginning of life would lead to a peaceful and meaningful world. "If what we really want is a new world, then education must take as its aim the development of these hidden possibilities" (Montessori, 1967a, p. 4).

Though Montessori (1967a) considered the first six years the most important period of life, she did not separate the importance of early education from that of later schooling. Her unified theory of education aimed at aiding the child's gaining of successive levels of independence from birth to maturity. "It is the child who makes the man, and no man exists who was not made by the child who once he was" (Montessori, 1967a, p. 15). Human development was, to Montessori, a continuous process.

Unique to this Italian educator was the fact that her concern for human progress led her to move from abstract theory to practical implementation. Her method has been called "perhaps the first truly systematic attempt to educate children" (Evans, 1971, p. 30). Though no one else, to this day, has identified a model which so completely acknowledges all aspects of early human development, the Montessori Method is still not being proposed in its entirety by educators outside of the Montessori Community as a potential model for early childhood education. In many textbooks for teacher education,

there are, at best, only references to fragments of the methodology, and there are many misunderstandings in evidence. There are some possible explanations for this.

Initial reception. When Montessori was first hailed in the United States, The Child Study Movement which had begun in 1893 (Austin, 1976) had almost run its course. The educational beliefs held in this country at the time, however, were not consistent with Montessori's conclusions drawn from her study of children. Kilpatrick of Columbia University, a student of John Dewey and one of the most respected members of America's educational elite, criticized the method. His book, The Montessori System Examined (Kilpatrick, 1914), had a deadly impact on Montessori education and is still perhaps one of the basic reasons for the relative isolation of Montessorians from professional educators which has persisted through the years (Evans, 1971, p. 46). Not long after Kilpatrick's (1914) examination of the Montessori system, the non-educational concerns of war demanded the full attention of this country's leaders. The disruption of trans-world communications left Americans out of touch with the Montessori movement in Europe. Montessori herself was forced to flee to Holland and was burned in effigy in her home country by Dictator Benito Mussolini, because she had taught children to think independently (Kramer, 1978; Claremont, Note 2). Ironically, when Montessori opened the first Children's House in Rome in 1907, Mussolini was a young journalist who lived nearby.

What is known about the method. Among other explanations which might be offered to account for limited acquaintance with the Montessori Method, there is the explanation of what observers bring away from their experiences visiting Montessori schools. There are many varied opinions about what constitutes the Montessori Method. "It's too rigid;" "It's too lenient;" "It's totally a discovery method, and the child receives no help;" "The child has no freedom at all." Such statements are based on short-term classroom observation or upon an acquaintance with someone else who has made such an observation. Theoretically, there is not this inconsistency. Practically, from school environment to school environment, there might be. At any rate, allowing such confusion to exist certainly does not create an atmosphere in which educators might look at the potential the method offers.

The critics. Reference has already been made to the limited or fragmented mention of Montessori theory or methodology that occasionally appears in textbooks for teachers. In the first quarter of the century several critics (Boyd, 1914; Culverwell, 1913; Nunn, 1923) attempted to examine the method as a unified whole. Where critical reference appears today, it is sad to find, at best, only one or two references to primary sources. It is as though education students today are given, if anything, a fleeting glance of a portion of Montessori methodology. One finger of a glove is presented without concern about the other fingers or the whole. One of

the greatest problems that emerges in this context is that of having access to information about the Montessori Method.

Clarity and cultishness. Montessori's own works are not well organized or efficiently written. One must range far and wide and repetitively among them to come up with a coherent picture of the method and its problems. Some of the Montessori books are composed of translated lectures. "It was often the transcriptions of these lectures, with little or no editing, that were turned into books" (McDermott, 1965, xiii). Perhaps that is why critics of the method refer to only one or two primary sources. Maybe that is why some of the Montessori teacher training programs limit student exposure to only two or three of Montessori's own works.

Another part of the access problem is the self-containment of the Montessori Community. There has been minimum interaction between the Montessorians and the larger educational community. There are no full-scale disseminations of this methodology to "outsiders." Those who defend the Montessori Method too often do so by virtue of its long-term existence and a reiteration of its author's claims which have yet to be consistently backed by empirical data. Those who wish to know about the Montessori Method must enter into the community, or cult, of its worshippers and protectors.

A consequence. This problem of lacking knowledge, or lacking access to it, is exemplified by the report of California's Task Force on Early Childhood Education (1972). In a

section titled "Contributions from Other Countries" an introductory paragraph in which Montessori education is hailed as one of the two most widely known and discussed efforts of other countries affecting the direction of early childhood education, the following two paragraphs appear on page 45:

> The unparalleled interest in early childhood learning has sparked a resurgence of inquiry into the effectiveness of Montessori education. When the Montessori method was first introduced in Italy in 1912, it was used with retarded children. It is interesting to note, however, that most of the recent Montessori work in this country has been done with privileged children.
>
> Little definitive research on the outcome of Montessori exists. What data there are appear to indicate that in some cases Montessori-trained preschool children achieve in the areas of cognitive task learning, autonomous learning, and perceptual discrimination skills. Additional research is needed.

There are several comments stimulated by the foregoing statements. First, though the method receives increased usage, significant inquiry into its effectiveness is lacking. Second, Montessori's work with retarded children in Italy predated the opening of her first children's house in 1907. As to the use of the method with privileged children, a third point is that the United States became reinterested in Montessori because of work with the disadvantaged in such programs as Head Start. Most of the recent work with Montessori in this country has served to extend applications of the method to a wide variety of children. Lastly, even if it is true that little definitive data exists, considering the data acknowledged by the

report, it would seem that the Montessori Method should have received more attention. One notes no Montessori citations among the selected references of the Task Force.

What is most striking is that the Task Force was seeking a particular kind of learning environment for children: one geared to individuals which did not classify them by age, grade, or accomplishment; one in which groups could and should be organized naturally; one inclusive of four-year-olds; one with a family-type age mix where older children help younger children; one which features a mixture of socioeconomic backgrounds; and one where a child's needs would be given first priority. The Report stipulated that the sought-after environment should be one in which children are free to inquire and discover, that is stimulating, comfortable, full of manipulative and creative materials, and which provides a quiet corner to which a child might escape from peers. There must also be provision in this special environment for responsive and perceptive guidance by a mature leader, sensitive to what a child wants to learn. Further, this environment is to be guided with the philosophy that "a child will not be able eventually to accept responsibility for his own learning if, at a very early age, he is not provided the opportunity to accept that responsibility" (Task Force Report, p. 27). Capable of meeting the physical and mental needs of children, this ideal environment should have trees and gardens to enjoy and should include nature in its environment and in its curriculum.

After establishing these kinds of needs for a learning environment, the report goes on to discuss eleven "successful" preschool programs. These eleven were selected from among one thousand programs for culturally disadvantaged children. The criteria for selection were: (1) improvement in achievement scores (measured through standardized tests); (2) gain to exceed that of a control group over the same time period--or to exceed national norms; and (3) pupil gains to be made in language or numerical skills.

There are several points which become clear to one acquainted with Montessori education and familiar with the happenings in the larger educational community. First, the Montessori Model theoretically meets all the stated needs of the sought-for learning environment, as will be evidenced in the sections of this paper dealing with The Child, Environment, Freedom, and Goals. A second point to be made is that, though such characteristics as responsibility for one's own learning are considered to be important, criteria for program selection do not include a demand for proof that high standardized test scores correlate positively with such characteristics. The last point that becomes clear is that the Montessori community must take the initiative to make itself known, and in so doing must accept a challenge to prove the claimed virtues of the Montessori Method--in other words, to act as worthy inheritors of the scientific process which Montessori initiated.

> The modest design of these incomplete notes is to give the results of an experiment that apparently opens the way for putting into practice those new principles of science which in these last years are tending to revolutionize the the work of deucation. (Montessori, 1964, p. 1)

Montessori saw her work as opening the way. She had not discovered all there was to discover--therefore, to view the plateau on which Montessori's life work rested at the time of her death as a mountaintop of attainment is to veto the essence of Montessori, the scientist.

Its protection by those who know it best and misunderstandings of it by those who know it least have inhibited the optimum development and dissemination of the Montessori Model and the potential for refinement which exists in its truest nature--not to mention its potential for answering the needs of young human beings, its raison d'etre.

The Montessori Movement

In the United States in the 1960's there were dozens of Montessori schools. In 1976 there were a thousand (Elkind, 1976). In this International Year of the Child, 1979, the method or its materials or both can be found in use in Montessori Schools affiliated with national and international Montessori organizations and in schools which are not affiliated but which use the name Montessori. Many public schools use Montessori components and identify them as such; many private schools also incorporate Montessori materials into their curriculum (Hainstock, 1978; National Montessori Reporter,

1978, 1979; Orem, 1971, 1972). It is impossible to state the actual number of Montessori schools in existence. In addition to schools which acknowledge use of the Montessori Method or materials or both, there are a number of schools which utilize the materials without identification of their origin, "without fanfare, in order to avoid possible controversy" (Hainstock, 1978, p. 44).

Boyd (1914) wrote that Montessori had to face, and did face, the modern problem of educating all the children of all the people. He assessed that she had devised a method of education which takes account of individuality in the daily routine of the school. To date the method has been used with culturally disadvantaged children, children who have Down's Syndrome, who are retarded, deaf, bilingual, bi-cultural, blind, multiply-handicapped, advantaged, average, below-average, and highly intelligent. It has provided a model for the establishment of preschool and pre-preschool learning environments inside and outside the home (Hainstock, 1976) and has been used as a structure for university level courses (Rosenstein, Note 3). Montessori materials are now shipped to over seventy of the world's countries (Neinhuis, 1979). Such wide and varied use makes Montessori's (1974) statement about the practicality of the method sound like an understatement: "On the practical side the method has the advantage of being able to draw together children of very different backgrounds" (p. 319).

There is, then, growth within the Montessori Community, and some of the potential explanations for that growth are worthy of examination.

Montessori and Piaget: Individualized education. The concern at a national level for consideration of programs appropriate for disadvantaged children which created new interest in Montessori sparked a reciprocal awakening interest in the work of Jean Piaget (Elkind, 1976). Piagetian theory today dominates the educational scene as its decision-making base (Ault, 1977). Piaget was familiar with Montessori's work (Elkind, 1976). Like Montessori,

> Piaget stresses that the child must be active in learning, that he must have concrete experiences from which to construct reality, and that only in consequence of his mental operations on the environment will he have the concepts that will give meaning to the words he hears and reads. (Elkind, 1976, p. 60)

Piaget provided an extensive empirical and theoretical base for an educational program in which children would be allowed to construct reality through active engagements with the environment (Elkind, 1976). Ault (1977) states, "Montessori's system seems most compatible with Piaget's theory" (p. 182). Though Ault qualified her statement by saying that Montessori's is not the only early childhood educational system, it is one of the most completely articulated models to take into account the necessity for education to derive from all of the individual human being's developmental needs.

> If, as Montessori and Piaget believe, learning is self-motivated, individually paced, and dependent upon a unique combination of physical maturation and prior experiences, then no group activity will suit the needs of the individual children who comprise the group. (Ault, 1977, p. 181)

Individualizing instruction. Boyd (1914) wrote that no matter how much the teacher adapts instruction to a child, it is still adapted to a "type" of child. It cannot be individualized. True mental appropriation, however, is always a matter for the child alone and cannot be anything less than individual. Ault (1977) echoes this description of human functioning sixty-three years later:

> Since only the individual himself knows whether a skill needs practice, the child must be given freedom in a learning environment to practice a needed skill as much as he needs to. The implication of this is that the child sets his own pace for learning. Only he can tell when he is ready to move on to the next task. (Ault, 1977, p. 179)

She further states that the teacher setting the pace may cause denial of needed practice. Upon reading the initial manuscript of this work, a Montessori teacher (Scheffler, Note 5) pointed out to me that the teacher setting the pace might also result in over-practicing because of the Montessori respect for repetition as an essential process of learning.

Montessori's was one of the original non-graded learning environments to individualize education through a child's self-selection and self-pacing (Evans, 1971).

> Since psychologists and educators do not currently know how to solve these match problems from without, it is reasonable to allow children to solve these for themselves through the self-selection of appropriate activities and materials. (Evans, 1971, p. 48)

J. McV. Hunt (1964) also viewed Montessori's system as one which provided an answer to the problem of the match because it provided materials of optimum challenge: not too difficult; not too simple.

Another aspect of indivualizing education is that of matching a child to an ideal teacher. Even if the dimensions of that match were spelled out (i.e., D. E. Hunt's work in 1964 (Note 4) with a Conceptual Systems approach) most educators would hasten to remind us of the economic infeasibility of such an attempt. Here, again, the Montessori Model provides a theoretical solution to the problem. A teaching interaction among the students in a Montessori classroom is encouraged by multi-age grouping. "The children learn from one another and throw themselves into the work with enthusiasm" (Montessori, 1965a, p. 59).

A non-competitive environment. The Montessori atmosphere requires non-competitiveness and therefore is facilitative of kind and helping relationships between older and younger children:

> This atmosphere develops a fellow-feeling, an attitude of mutual aid, and most wonderful of all, an intelligent interest on the part of older children in the progress of their little companions. (Montessori, 1965a, p. 59)

Montessori (1964) observed that, under these conditions, "no heart suffers from another's wealth, but the triumph of one is a delight to all" (p. 7).

Other advantages. In addition to offering solutions for the "match" problems raised by individualizing education, the method also provides a theoretical base for facilitating social development through shared materials, mutual responsibility for care of the environment, the availability of a variety of companions, and the opportunity to share one's knowledge with others (Evans, 1971).

The Montessori opportunity also provides a non-sexist and an acultural model for educational intervention. "Our goal in the education of the young child should be to help him develop and not to furnish him with a kind of culture" (Montessori, 1974, p. 178).

Current Educational Beliefs

"Times have changed, and science has made great progress . . . but our principles have only been confirmed" (Montessori, 1974, p. ix). Many of Montessori's observations about educating young children which were rejected earlier in this century have now gained empirical support. Educators in the early part of the century believed that preschool experience was insignificant. They believed that intelligence was fixed by heredity and that development was predetermined. The motivation for behavior was thought to be instincts or painful

stimuli (J. McV. Hunt, 1974). Now, half a century later, researchers agree with Montessori's belief in the necessity of quality early educational experiences designed to aid the large percentage of intellectual development (over half) that takes place before age six (Bloom, 1964). There is acknowledgment that preschool and kindergarten programs have been limiting what children could learn and enjoy (Edmonson, 1971). Further, J. McV. Hunt (1974) points out that there is now acknowledgment that being endowed hereditarily with intelligence is no guarantee that its potential will be realized.

Most educational programs are still geared to "readiness" concepts. Of note is that most experimental research on readiness was concerned with motor behavior rather than cognitive or social behavior; yet generalizations were made to these later areas with conclusions that cognitive skill development, like physical skill development, followed a fixed readiness pattern (Homme & Tosti, 1973). Renewed interest in cognitive and social development has begun to overcome some of the handicaps imposed by traditional readiness concepts (Homme & Tosti, 1973). Recent research (Brainerd, 1977) has demonstrated that children can learn the meaning of concepts such as conservation at earlier ages than previously supposed if they are exposed to appropriate environmental contingencies.

Montessori's observation about physical involvement with the environment being an essential to learning finds support in current research. Hennings, Kornreich, and Berell (1971)

CHAPTER 2

AN INTRODUCTION TO THE MONTESSORI METHOD

> It is by scientific and rational means also that we must facilitate that inner work of psychical adaptation to be accomplished within the child.... this is the aim which underlies my method of infant education, and it is for this reason that certain principles which it enunciates, together with that part which deals with the techniques of their practical application, are not of a general character, but have special reference to the particular case of the child from three to seven years of age, i.e., to the needs of a formative period of life. (Montessori, 1965a, p. 36)

Goals

Montessori (1964) stated, "Our aim is to discipline for activity, for work, for good; not for immobility, not for passivity, not for obedience" (p. 93).

Discipline for independence. The Montessori goal of independence is both an immediate and a long-range goal:

> My vision of the future is no longer of people taking exams and proceeding on that certification from the secondary school to the university, but of individuals passing from one stage of independence to a higher, by means of their own activity, through their own effort of will, which constitutes the inner evolution of the individual. (Montessori, 1973, Preface)

An individual in today's society, sad to say, has this kind of freedom before and perhaps after the mandated experience we call the years of formal education. Some individuals even have this freedom to progress during the years of formal education the hours of the day when they are not in school. But seldom does it exist within the segregated institutions we

call schools, because discipline within those institutions, despite goals of self-discipline and independence, has come to mean external control. The self-discipline for the individual sought by Montessori "could never be obtained by commands, exhortations, or by any of the ordinary means used for keeping order" (Montessori, 1974, p. 304). This discipline has, as was pointed out earlier, its first glimmerings of origin in work. If any external control is to be exerted, its action is to be positive--toward, or supportive of, the observable aspects of self-discipline and not for punishment.

Montessori describes the discipline obtained by a method based on liberty (Montessori, 1964): children three to seven doing their own work; the teacher there for those who need the teacher, not for those who do not; no quarrels; the accomplishment of one evokes admiration and joy in others. Montessorian independence would set children free from the need for external prizes and punishments, would develop their capacity to recognize mistakes and correct them, and would motivate their fusion into a social group (Montessori, 1967a, p. 244). To Montessori

> A room in which all the children move about usefully, intelligently, and voluntarily, without committing any rough or rude act, would seem to me a classroom very well disciplined indeed. (Montessori, 1964, p. 93)

To achieve this kind of goal, one must understand what Boyd (1914) called Montessori's two-fold educational aim. There is the biological aim: to help the child's natural (physical)

development. There is the social aim: to prepare the individual for his environment. And these are always interwoven; if one dominates over the other, it is because of a particular child's needs at a particular time.

To be effective with young children, teaching must assist the advance toward independence. It must initiate children into those activities they can perform themselves such as walking without assistance, running, using stairs, picking up fallen objects, dressing and undressing, washing themselves, expressing their needs in a way that is clearly understood, attempting to satisfy their desires through their own efforts. All this is the initial basis of an education for independence. (Montessori, 1974) "The education of even a very small child, therefore, does not aim at preparing him for school but for life" (Montessori, 1974, Preface).

The social microcosm. The kind of social microcosm that is the goal of the ideal Montessori classroom multiplied throughout the endeavor we call education might result in influencing the macrocosm we call "real life" to be filled with useful, intelligent, and voluntary action, without roughness or rudeness. How well disciplined are the environments in which we live--and by whom are they controlled?

Proactive and reactive intervention. This seems an appropriate place to call attention to a newly discernible difference between proactive and reactive intervention. Remember Montessori's remarks about the joy of children in

the accomplishments of their classmates. This freedom to enjoy others is a freedom that few people possess. We have been shaped by centuries of competitive behavior to believe in the spirit of competition: "that's the way it is and that's the way it's gotta' be." Methods so wasteful of human resources as competition at the expense of others are only tolerated because they are time-honored, to paraphrase Culverwell (1914). When I think about the truly competent individuals I know and note the control they exercise over the events of their lives and experience or see experienced the aid they give joyfully to others to become equally independent, I realize that their success is never at the expense of another individual.

Our society, founded in the name of freedom, is in the process of an intense struggle over individual freedom. Women have been handed a tremendous challenge to seek a larger portion of responsibility for the macrocosm of which all humans are a part while men have been challenged to seek a larger portion of responsibility for the microcosms in which individual human beings daily relate. In other words, all people are being called on to lead equally responsible lives, and this responsibility is not contingent upon gender. The type of sharing required for the successful meeting of these challenges leaves no room for competition between individuals: each must, instead, be helped to develop and give his or her best. If we speak, then, in terms of inhibiting rough or

rude acts, we are speaking reactively. If we speak, however, in terms of facilitating abilities to be altruistic--a human characteristic that has recently gained much attention by its conspicuous absence in the wake of the individualism tide--we are speaking proactively. As Montessori stated, education has as its aim to expend its efforts for, not against.

Though Montessori speaks in terms which sound proactive, having a cardinal rule of non-interference is not a proactive stance. It may be facilitative of one, however, if the opportunity is utilized. For "non-interference" should be substituted "appropriate behavior," the reciprocity of which maximizes human potential.

The Role of Education

There seems to be an unresolved question looming behind most educational endeavors, one which it is perhaps needful to acknowledge before proceeding.

> The question at stake is fundamental. Do we believe that the school introduces the child to the rote assimilation of an already-structured version of human life, or do we believe that the school is the arch through which the process of insight, liberation, and human growth proceeds? (McDermott, 1965, p. xxvi)

It is clear that Montessori stands as one who would aid human refinement of the insight and liberation needed to progress through the archway. Her view of education was not the utilitarian view so long advocated which looked first at the society's or the adult's needs and then decided what course

a child should follow. Rather, what she termed the "new education" had as its primary aim

> the discovery and freeing of the child. The first problem with which it is concerned is the child's very existence, and the second is that of providing him with the necessary aid as he advances toward maturity. This means that there must be a suitable environment for the child's growth. Obstacles must be reduced to a minimum and the surroundings should provide the necessary means for the exercise of those activities which develop a child's energies. Since adults are also a part of a child's environment, they should adapt themselves to his needs. They should not be an obstacle to a child's independent activities, nor should they carry out for him those activities by means of which a child reaches maturity. (Montessori, 1966, p. 110)

Her education was one which "guides the spontaneous education of a child and imparts essential concepts" (Montessori, 1974, p. 163). To Montessori (1964) education meant "the active help given to the normal expansion of the life of the child" (p. 104). The true and proper function of education was defined as, "A modifying action that increases one's powers of discrimination" (Montessori, 1974, p. 182). Montessori felt that education must "interest the child profoundly in an external activity to which he will give all his potential" (Montessori, 1973, p. 24) and must see to it that "the child does not confound <u>good</u> with <u>immobility</u> and <u>evil</u> with <u>activity</u>" (Montessori, 1964, p. 93).

The point of departure for a true understanding of her work was not to consider it a method of education at all, but rather "the result of having observed the development of

psychological phenomena which had hitherto been unknown and unobserved" (Montessori, 1974, p. 326).

The Child

The history of the education of the young reaches as far back as human memory. Belief in the child's ability to act as a qualified selector of the experiences which will comprise his education is new and not widely accepted. Yet, few would argue that making appropriate choices in life is an unimportant skill. And, far from the folklore from which it proceeded, "practice makes perfect" is an established learning principle with attendant rules for seeing that it succeeds. Despite the agreement of most early childhood educators on the importance of choice-making, however, most programs for children are still primarily prescriptive with the child performing externally assigned (and often arbitrary) tasks. Free choice time, if there is one, is relegated to a very small percentage of the time spent in school. This illogical turn of events is centered in the way adults view not children, but themselves:

> In their dealings with children adults.... look upon everything pertaining to a child's soul from their own point of view and, consequently, their misapprehensions are constantly on the increase....the adult looks upon himself as the child's creator and judges the child's actions as good or bad from the viewpoint of his own relations with the child. The adult makes himself the touchstone of what is good and what is evil in the child. He is infallible, the model upon which the child must be molded. Any deviation on the child's part from adult ways is

> regarded as an evil which the adult hastens to correct.
>
> An adult who acts in this way, even though he may be convinced that he is filled with zeal, love, and a spirit of sacrifice on behalf of his child, unconsciously suppresses the development of the child's own personality. (Montessori, 1966, p. 16)

In other words, there is a distinction between merely giving one's life for another and giving another his or her own life. The former is conditional: it demands imitation of the sacrificer. Instead of a giving of the self, there is a vicarious perpetuation of it. To give another his or her own life, however, implies that the giver is willing to aid and support a self unlike his or her own under any and all circumstances.

Montessori's perspective of the child, that "he makes everything possible" (Montessori, 1967a, p. 115), influenced her to view the child's task of self-construction as sacred; and since only the child could perform the task, adults had no right to interrupt--nor to supplant with arbitrary tasks--this process. By heeding the child's sensitivities the adult could aid human development. Ignoring them, the adult could injure the child. But in no way could the adult perform for the child the task of growing into a responsible adult.

To Montessori natural development meant "gaining successive levels of independence" (Montessori, 1967a, p. 84). This natural development occurred in the context of adapting to a particular environment and then relating to other

environments. To Montessori, environment was only secondary "in the phenomena of life; it can modify in that it can help or hinder, but it can never create" (Montessori, 1964, p. 105). Yet, she opted for the environment as crucial in the determination of the human organism, and this acknowledgment combined with her medical background and her understanding of scientific methodology to produce an educational theory which accorded new interpretations to the role of teacher and learner (Rambusch, 1965).

> My idea was that in order to establish natural, rational methods, it was essential that we make numerous, exact, and rational observations of man as an individual, principally during infancy, which is the age at which the foundations of education and culture must be laid. (Montessori, 1964, p. 3)

Her observations of children drew Montessori to conclusions which would heavily influence the learning environment she established: She discovered that children need to observe, to reflect, to learn to concentrate, to isolate themselves at times, and sometimes to suspend their activities in silence. Montessori believed that a child learned all the time--there could be no such place as a non-learning environment (Montessori, 1974). Montessori believed that helplessness at birth and the child's qualities as a social individual were limiting. Education, thus, "must intervene to help the child to a conquest of these various obstacles. . . .The first form of educational intervention must tend to lead the child toward independence" (Montessori, 1964, p. 95). It was

necessary that this intervention respect two groups of functions that the child needs to establish: (1) the motor functions by which he or she is able to secure balance and learn to walk and to coordinate movements, and (2) the sensory functions through which, receiving sensations from the environment, the child lays the foundations of intelligence by a continual exercise of observation, comparison, and judgment (Montessori, 1964). In connection with Montessori's understanding of the necessity for continuous education to begin very early in a child's life, it has been pointed out that it is ironic that Montessorians continue to distinguish between "preschool" and "school" (Scheffler, Note 5).

Montessori's observations and experiments led her to a faith in the child's own abilities to choose from the environment what was suitable and necessary for growth (Montessori, 1966). I cannot think of Montessori's faith in the child without thinking of Burton White's (1975) comments about adults in a child's first eight months of life. He states that up through the first eight months, parents basically do very well with their infants. After that, things can go down hill. Perhaps it is only during those first eight months that an infant, if ever, is allowed "free choice" from the environment of what is suitable and necessary for growth because adults at that time respond to all the needs of the infant. When the going gets more complex, adults attempt to sort out infant needs, and at this time it becomes very easy

to shift over to the adult viewpoint Montessori described. Such a viewpoint relegates the child's needs to second place, however, only teaching a child that those needs are secondary--not how to live with them. Or if it does provide a model for living with them, that model would be to place them before someone else's needs. When Montessori spoke of self-sacrifice in serving the child, she meant placing adult needs in second place.

The child shall make everything possible only if this is allowed and facilitated. Thus, Montessori designed a special environment and special materials which would provide the freedom necessary for the child to perform the tasks which would develop the needed skills for successive and successful independence: independence now was the key to independence later. Montessori's description of the child as he or she should be--the goal child for whom her method was designed--would provide an excellent model for the adults of the world:

> Here is the child as he should be: the worker who never tires, the calm child who seeks the maximum of effort, who tries to help the work while knowing how to respect the independence of others, in reality, the true child. (Montessori, 1963, p. 89)

Montessori (1964) used a clock analogy to describe the differences between her approach to the child's education and the more traditional approach. Her method would "wind the clock" initially. Once engaged, the clock (the child) would take off because running is, in itself, reinforcing; further,

the child would then self-wind. In the traditional education, teachers merely move the hands on the face of the clock.

Despite Montessori's (1967a) expression of extreme faith in the child as the true source for the renewal of humanity, there is in her writings a dichotomy which emerges which is worth noting. Acknowledging it might help to provide a base for clarification of the somewhat ambiguous descriptions she renders of the relationship between teacher and child in terms of activity and passivity. (This will be discussed in Chapter 3, "Montessori's Teacher" and Chapter 4, "Some Shaping Toward a More Contrived Manner.") Montessori (1967a, p. 285) states, "Children unaided can construct an orderly society." The question that asserts itself is, "Unaided under what circumstances?" because elsewhere, when describing the behavior of one of her young school children serving soup to classmates from a heavy, hot tureen--in such a dignified manner that it brought tears to the eyes of onlookers--she describes the "usual" behavior of children: "Anyone who sees children acting in this way must reflect on the ordinary behavior of four-year-olds who shout, break everything, and must be constantly waited upon" (Montessori, 1974, p. 304). This is not someone who believes in the innate goodness of children, though she has been placed in the company of educators and philosophers who did--i.e., Rousseau, Pestalozzi, and Froebel (Evans, 1971). What Montessori perceived was that there was potential in each child for good or for evil and her's was a method

designed with the intention of releasing the good. A rephrasing of the earlier statement might read: "Children in an appropriate environment and with appropriate guidance can construct an orderly society." Montessori held high expectations for that environment and for what constitutes an orderly society.

The Environment

Plank (1971) stated that the Montessori Method provided a stronger structure of environment and teaching equipment with specific tasks in mind than methods more accepted in America. Montessori indicated:

> What is most characteristic of our system of education is the emphasis that is placed upon the environment (Montessori, 1966, p. 110). . . .not of a fixed type....may vary according to the financial resources at disposal and to the opportunities afforded by the environment. (Montessori, 1965a, p. 37)

Montessori (1966) stated that before any system of education could be elaborated, a favorable environment that would encourage a child's natural gifts must be created. She felt that all that was needed was to remove the obstacles--that this should be the basis of and point of departure for all education. These bases derived from her scientific stance which mandated that the environment must reveal the "natural" child before the child's needs could be assessed.

In order to attract the child's attention and facilitate his/her interaction, the physical environment must be orderly,

attractive, and facilitative of movement, and must make all its objects and functions easily accessible to and governable by the child. It is the children who care for this environment, and, therefore, even child-size cleaning implements are a basic necessity.

This environment is to include an open-air space in direct communication with the schoolroom "so that the children may be free to go and come as they like, throughout the entire day" (Montessori, 1964, pp. 80-81). I have seen many classrooms, Montessorian and others, which have an open-air space with the accessibility described. I have yet to see a child allowed to navigate to that space of his own volition in any part of a day. To the contrary, I have seen children called away from a door they have opened because "It isn't time" in the teacher's schedule. I shall never forget the tears on the face of a three-year-old girl who had performed all the steps in the Practical Life "Bread Grating" exercise (See Appendix C) and had just opened the door to go outside and feed the birds when her teacher sharply reprimanded her for opening it. "It is the duty of teachers to secure that the environment shall generate freedom" (Culverwell, 1913, p. 234). This environmental freedom is to be both physical and psychological.

At the same time the environment has need of promoting freedom, it must also promote self-development:

> The child only develops the power of long continued attention by practice in continuing to attend--and he can only continue to attend to that which interests him; therefore the teacher must provide an environment which fulfills that condition. (Culverwell, 1913, p. 285)

"The variety of the objects and the colors are therefore an inducement to work and hence to final success" (Montessori, 1965a, p. 145).

The physical environment Montessori required does not seem difficult to achieve. Many, many children's programs exist in such physical settings as she describes: a pleasant environment that includes cleanliness, child-size furnishings, and a nice outdoor area (Montessori, 1966). But in how many of these does the child find the freedom Montessori envisioned to be left to his or her own resources (Montessori, 1974)?

The Materials

Montessori (1974) indicated that motor activity must have a goal and must be connected with mental activity. "There is a close relationship between movement and the desire to learn" (Montessori, 1974, p. 306).

The most completely evolved materials available for the Montessori classroom are Montessori's didactic materials for the training of human senses. The design and use of these materials respect the relationship Montessori perceived to exist between movement and learning. Montessori developed the didactic materials partially in response to the fact that

children's sense skills were often tested but seldom trained.

> Experimental psychology has so far devoted its attention to perfecting the instruments by which the sensations are measured. No one has attempted the methodical preparation of the individual for the sensations. (Montessori, 1964, p. 215)

Yet, she did not claim to have perfected her system of sense training:

> I do not claim to have brought to perfection the method of sense training as applied to young children. I do believe, however, that it opens a new field of psychological research, promising rich and valuable results. (Montessori, 1964, p. 215)

There were specific guidelines which materials for these learning experiences must follow: "One should proceed from few stimuli strongly contrasting, to many stimuli in gradual differentiation always more imperceptible" (Montessori, 1964, p. 184). It was not enough to attain this fineness of differential perception; the whole purpose of such refinement was to be able to associate that perception with language in order to communicate with and about the environment (Boyd, 1914).

One criticism of the didactic materials is that self-expression, usually considered to be essential to freedom, finds little encouragement from the didactic materials (Evans, 1971). In perspective, the didactic materials are only part of a process which facilitates self-expression. The environment in which they are used and the human interactions within that environment are inseparable from the experiences

with the materials themselves. The didactic materials are tools of self-expression per se only in the instance in which they communicate what a child knows about certain processes. They are facilitative of self-expression in that they provide a means for ordering and understanding the content of experience, necessary antecedents to effective self-expression.

There were several important observations which Montessori took into account as she developed materials for learning. The most basic one was the child's need for movement and the importance of integrating that need with the intellect. She also observed the child's enjoyment of repetition which was related to the sensitive periods. The child "lays the foundations of his intelligence by a continual exercise of observation, comparison, and judgment" (Montessori, 1965a, pp. 34-35).

Materialized abstractions. The Montessori sensorial materials can be called "materialized abstractions." They represent abstract concepts in a specific, concrete manner. One author (Evans, 1971) has claimed that there are three objectives to be realized through sensory education: the ability to recognize and match identical objects; the ability to recognize contrasts and extremes in a series; the ability to discriminate among similar items. This is the progression that the didactic materials for education of the senses follow. But Montessori had more in mind. The use of these materials represents a cycle of activity through which a child experiences the processes of observing, comparing, and judging. For

example, the aim of the Knobbed Cylinders (Appendix D) is not merely an external one--that the child should learn to place the cylinders and know how to perform an exercise, but "that the child train himself to observe; that he be led to make comparisons between objects, to form judgments, to reason and to decide" (Montessori, 1965a, p. 71). Of interest in connection with the materialization of processes is the work of a number of psychologists who are studying self-regulatory behavior (Clement, Note 7; Hosford, Notes 8 and 9; Meichenbaum, Note 10). It appears that the earlier an intervention is made into the cycle of human behavior which includes the thoughts that precede actions, the more impact potential it can have in determining the quality of behavior. Their work focuses on the cognitions that precede human actions. They have demonstrated that if the individual can be aided to have more appropriate processes of thought (pre-behavior), then behavior will also be more appropriate. I believe that there are implications here which reinforce Montessori's intervention since it is directed at establishing order in the processes which precede overt behavior. For that matter, her intervention may even be seen as pre-thought in the sense that preverbal children grasp processes before they know words for them. Certainly an interesting question is raised regarding the optimum timing of educational interventions.

Montessorians have long acknowledged that children who begin a Montessori education at age two-and-one-half acquire a

greater number of skills and a larger amount of knowledge much more easily than a child who enters the system at age four. Theoretically, by age four a number of the child's sensitive periods would have passed. Montessori (1967a) believed that not meeting these periods with an appropriate environment and necessary materials for their development inhibited the maximazation of human potential in those particular areas of learning.

Isolation of quality or attribute. Montessori incrementalized the sensorial materials and experiences so that only a particular quality or difficulty of a stimulus is worked with at one time. For example, if a child chooses a color-learning task, color will be the only variant in the materials. Shapes and sizes of the colored objects will be consistent, inhibiting the chance of confusion. I will never forget the confusion and frustration of one youngster being taught colors by a teacher who had chosen variously shaped and variously colored blocks for the color lesson. The child, in the first place, was more interested in looking at books on a nearby rack. This child knew the names of basic geometric shapes and from his knowledge of them generalized after a few moments of instruction that all rectangles must be red, all squares blue, since the two rectangles he was shown first were red, and the first two squares he was shown were blue. Such was not the case for the remaining shapes, however, and both teacher and child became unhappy in the moments of the lesson. Most children just seem to

"pick up" the various colors "by experience." But experience--even in many classrooms--is a trial and error affair unless success can be guaranteed and frustration removed. Montessori's isolation offers that opportunity.

Isolation of sense. Another feature of Montessori's specialized tasks is working while isolating the sense as much as possible. For instance, if the baric sense is being trained, the child can do work blindfolded. The same would be true for building auditory acuity. Both auditory and visual acuity are sharpened by an appreciation for silence which is an early lesson in Montessori education--and a facilitator of concentration.

Teach what is to be learned. Montessori taught in a very specific manner. A study by Ball and Campbell (1970) is a striking example of the problem of non-specific teaching, a method often used. After a pre-test on conservation, which showed no significant between-group differences, the experimental group was assigned to work with the Montessori Cylinder Blocks. The control group was assigned to work with jigsaw puzzles, received help when needed, and socialized. Children in both groups were then tested again for their understanding of the conservation concept. The control group showed a gain. The experimental group showed a significant loss. Needless-to-say, this proves nothing about the superiority or inferiority of the Montessori materials or method. The study fails to measure the effects of such variables as

the pre-test, the availability of help when needed, and socialization. Nor has attempt been made to find out whether conservation might not be more appropriately taught by teaching an exercise in conservation. Montessori did not design the Cylinder Blocks to be direct instruction for the conservation concept. Indeed, it might form an early component in an incrementalized set of exercises leading up to activity which directly involves this concept. The Practical Life exercises of dry and liquid pouring might also be components of learning this concept. But it is only as a number of components are threaded together, demonstrated, practiced, and articulated that the child becomes aware of concepts. And that is what the Montessori lessons and materials are designed to facilitate. Care of self, care of the environment, gardening, manual work, clay work, gymnastics exercises, music, language, mathematics, education for the visual, tactile, olfactory, gustatory, auditory, baric, chromatic, kinesthetic, and stereognostic senses are all analyzed into components which are taught with very precise movements and at a pace comparable to slowing down a movie film to a frame by frame encounter so that every step may be observed by one learning something for the first time. Initial teaching even assists the child to sit and rise and to take up and lay down and offer objects to others gracefully (Montessori, 1965a).

Control of error. The earliest didactic materials have built-in controls for error which a child is capable of

recognizing. As the child becomes capable of finer discrimination, more and more of the control of error resides within the child's judgment and less in the structure of the material. Since it is a goal for a teacher not to be the control of error (this weakens a child's independence), it is important that the child be facilitated in self-correcting all work, i.e., programmed workbooks with answer sheets which the child can use to correct his or her own work may be used instead of those which require teacher-correction.

Tripartite curriculum. One reads of the Montessori didactic materials being utilized apart from the philosophy from which they derived. It is important to understand that they are designed to be used in a particular kind of environment (one which promotes the child's freedom) and that their design and their use potential are geared to the "whole" child. The technique of the Montessori Method

> as it follows the guidance of the natural physiological and psychical development of the child may be divided into three parts: Motor education, Sensory education, and Language. (Montessori, 1965a, pp. 49-50)

The motor education provides the control of movement necessary for a quality sensory education which provides the basis for language learning. Every piece of equipment and the manner in which it is presented considers all three aspects. There is great economy and efficiency in this design for integrated learning.

The child first learns to control gross and fine motor movements through the care and management of the environment (Montessori, 1965a, p. 50). Through Practical Life exercises, concentration is built. Montessori felt that during the development of concentration, children require an environment of special things to do; after the attention span has been lengthened, there should be occupations of many kinds (Montessori, 1967a). When the specific senses have been trained with the didactic materials designed for their refinement--after an integrated experience which probably, as has been noted earlier, predates (but facilitates) the child's verbal behavior--the child learns to articulate those training experiences by assigning names to the objects and processes he has experienced. Then the child is ready for intellectual activities with the math and language materials. Through being allowed to choose and complete motor, sensory, and intellectual exercises, the child gains preparation for and practice in observing, comparing, classifying, and reasoning (Orem, 1971). Please note that this kind of activity constitutes the child's whole day in a Montessori environment. Free choice, theoretically, is not relegated to some arbitrary time period assigned by the teacher.

Indirect preparation. This Montessorian concept came from Montessori's medical background and played a key part in formulating and sequencing curriculum and materials. Analyzing the development of human cells, she noted "specialization,

although it occurs for the sake of a particular function, does so before the function begins to operate" (Montessori, 1967a, p. 41). Translated to her teaching materials, this meant that no piece of equipment existed which did not have a relationship to the child's previous experience and a connection with where the child needed to go. I like to conceptualize this Montessorian unity as the Great Premackian Stairway. The Premack Principle has been more commonly called "Grandma's Law": First work, then play. Actually, what Premack's Principle states is that if one behavior occurs more often (high probability behavior) than another (low probability behavior), the more frequently occurring one can be used to motivate the occurrence of the less frequent one (Reese, 1978). This pairing of a low probability behavior (I hate to sit here and type page after page) with a high probability behavior (I do enjoy a sip of coffee after each typed page) results in the accomplishment of a task which leads to a specified goal (completing the manuscript). Montessori's anticipation of this principle is even less contrived than the above example. Her demand that the materials be attractive and that they "call" to the children made of the learning experiences available in the environment high probability behaviors. In the performance of these high probability behaviors, the child learned component skills for less likely behaviors which eventually accumulated to produce what Montessori called "explosions" into reading or writing. Actually, these

explosions were prepared for with utmost care. For example, when the child is first shown to place the three finger grip of the right hand on a Practical Life exercise pouring pitcher (See Appendix E) and is taught to begin at the left, not only is the pouring skill refined, but the development of fine motor coordination and the initiation of the visual sequence required for writing are low probability behaviors built into a high probability behavior, the pouring which most children thoroughly enjoy. When the child moves into the sense exercises, such activities as choosing colors with which to outline and color in selected inset shapes form the levers which enable the child to become possessed of a firm, bold, and beautiful handwriting (Montessori, 1967a). It is, then, as though these levers (or high probability behaviors) bring along to the next step in the stairway that particular skill (low probability behavior) which will be combined with other skills to become high probability behaviors--or attained goals.

Also at work on each stair level is what Guthrie called contiguity theory. Evans (1971, p. 45) describes this at work in the utilization of the didactic materials: "When a stimulus pattern which has been accompanied by a movement recurs, it will tend to be followed by that same movement." For this to occur, attention must be given to appropriate cues to direct a learner's attention and prompt an appropriate response. The design of the materials and the method of

their demonstration and use provide strong cues.

The Three Period Lesson. Consistent with the three-part curriculum is Montessori's use of Seguin's Three Period Lesson. (See Appendix F for a sample of the Three Period Lesson.) Montessori (1964) did not believe that the Three Period Lesson could be improved upon as a resource for evaluating a child's progress. Seguin, a French medical-doctor-turned-educator, had developed this tool while working with retarded children.

The first of the three periods is the association of the sensory perception with the name. Even a pre-verbal child is always introduced to a curriculum item and the sensations experienced by their names. After motor involvement with the material, the child is asked to indicate what a named item is (Second Period). If period two is responded to appropriately, the lesson proceeds to the Third Period in which the child is asked to answer a "What is this?" question. (Montessori, 1964)

Non-Montessori materials and methods. Montessori did not say that her materials alone were to fill the environment. But, in selecting other materials or curriculum components for the classroom it is necessary to acknowledge the principles which guided Montessori's development of materials. The materials are to be specific to a particular task for a particular aim; they are to be incrementalized into their

smallest components; they are to respect isolation of quality (difficulty) and sense and provide cues to aid in discrimination. Further they are to be utilized in an environment which allows for child choice and which provides ample time (by the child's determination) for practice (repetition), placing corrective processes within the child's control. They are to meet the demands for sensory, motor, and language involvement and are to be sequenced appropriately, building on what the child has already mastered and moving him toward mastery of more difficult levels of movement and thought.

There are a number of Montessori schools that extol the virtues of Montessori's methodology and didactic materials and then turn around and import language, music, or other special subject area teachers to come in and teach the children their specialties, at a time and with materials and in a method convenient to the teachers. It is understandable that specialties such as foreign languages and music might not be the strengths of Montessori-trained teachers who wish to have their students gain experience in these areas, but very often specialty teachers have an altogether different philosophy and use methodology incompatible with Montessori principles. If nothing else within the practicing Montessori community is saturated with heuristic power, certainly this aspect is. Here would be an opportunity to measure the effects of different teaching methods on the same child.

The use of materials. A variety of interpretations and attitudes has been exhibited regarding the use of the Montessori materials. When told about my interest in Montessori methodology, one professor of education wanted to know why in the world I would want to pursue a system of education that insisted on an extreme of the discovery process and did not help the child to learn. She related her experience of observing in one Montessori classroom where a teacher allowed a child to discover a battery by playing with it; no other materials were offered the child, and no further instructions were given. Unfortunately, that was this educator's sole encounter with and limited perception of Montessori education. Other individuals reacting to the Montessori Method find it too restrictive and too confining in its instructions for the use of materials. Perhaps both extremes of reaction find a basis in Montessori's own interpretation of what constitutes erroneous use of the materials. Montessori (1974) defined two categories of error: one was immaturity and the other was ill will. In the former case, if a child does not yet see that a cylinder is too small for an opening in the block, immaturity is the reason and the error is ignored. In the latter case, there is to be correction, because the result of ill will is wasted energy, uproar, lack of concentration, and prevention of a child's ability to grow and develop. Examples of such errors are given: a child drags the inset stand*

*The metal inset stands are two wooden stands, each about six inches wide, twenty-eight inches long, elevated at the back and with a slight raised edge at the front, used for display and storage of the ten metal insets.

around as though it were a cart; a child builds houses of the spools of colored silk; the child walks on rods laid out in a row; the child wraps one of the cloths for teaching how to button about his head like a scarf. Juxtapose to these errors this description: "As soon as he has built the tower, the child, with a blow of his hand, knocks it down, so that the cubes are scattered on the carpet, and then he builds it up again" (Montessori, 1965a, p. 72). I have observed a great deal of uproar and interrupted concentration through such activity. I have also seen classrooms in which the Pink Tower (Appendix G) is disassembled with as much control as it is assembled. In my own classroom children demonstrated extensive concentration and fine motor coordination constructing edifices with the Color Tablets.

It appears that the consequences of behavior in the classroom are just as demanding of attention as the processes which teachers are instructed to observe. This will be discussed further in Chapters 3 and 4.

Creativity

Montessori felt strongly that true creativity must be based in a knowledge of reality. As Lillard (1973) points out, there is empirical data supportive of this position. Plank (1971) found in the methodology less stress on creativity in the arts and more on creativity in learning.

There were times when Montessori had her students work

with clay, but she expressed a fear that children might imitate a model made of clay, and this might be destructive of individuality. This is ironic in light of her extreme faith in the child to maintain individuality when imitating the processes modeled for learning practical life, sensorial, math, language, or other skills. On the one hand she seemed to be vehemently opposed to imitation; on the other, she capitalized on the child's unique capacity for it. That she was unable to resolve this dichotomy has been an unfortunate legacy to those who have accepted the Montessori Method as a completed package--and has perhaps robbed many a child of a great deal of joy and development through the experience of utilizing various art media. Regina Barnett has reached out to help fill this vacuum. In her book, Let Out the Sunshine (1974), art skills are broken down into easy increments. Teaching the skills for interacting with art media, like teaching any of the other skills for life, can aid the child's self-expression and communication by providing a structure through which the child's own content can be made visible to others.

Of course, there is still confusion as to what one really means when using the word "creativity," not to mention the uncertainty of determining just what process(es) of education might turn out more creative individuals. For some individuals, creativity means painting or sculpturing or some such artifact-producing involvement; for others, creativity is the process of living life successfully.

Anyone who has ever watched children involved with

various art media will attest to the joy provided for many children through such interaction. The experience of two-year-old Russell his first time at the easel is a happy example. He was completely oblivious of everything around him. His whole body swayed with the movement of his brush stroke to the tempo of the song with which he was accompanying his work. I am sure that Michelangelo's face could have attained such a rapturously transformed expression as Russell's only at those special moments when he experienced the release of his full potential to express his feelings through his painting or sculpture. It is just this kind of exhilaration--or joy, as Montessori put it--that comes to the successful learner. Only a very carefully contrived educational intervention can begin to accommodate this kind of success which builds its component experiences into responsible and independent functioning of the human being. Opportunities for refining the skills for a wide variety of functions should be provided; none should be forced upon the child; neither should the child be deprived of such opportunities.

A number of Montessori teachers I have known have not included any kind of art experiences as a part of their classroom potential. These teachers, ironically--or perhaps consistently--also did not provide exercises for the thermic area of tactile discrimination, for the gustatory sense, or the olfactory sense. When questioned as to why, they responded that they felt the other curriculum items were

sufficient to teach the children even more than they needed to know anyway--at least they filled the time, and the children were not bored. Besides, they rationalized, children learn hot and cold and tastes and smells at home anyway. Further, the demands on teacher time did not leave time to mess around with messy activities. Yet, the epitome of Montessori methodology is purposely leaving nothing to chance.

Freedom

"The school must permit the free natural manifestations of the child. . . . This is the essential reform" (Montessori, 1964, p. 15). Here--not in the environment, not in the resources available--is the heart of the educational reform embodied in Montessori's Method. Both environment and materials were contrived to provide the child maximum freedom in the learning environment.

> The children in a Montessori class are given the freedom that is the liberty of the human being, and this freedom allows the children to grow in social grace, inner discipline, and joy. These are the birthright of the human being who has been allowed to develop essential human qualities. (Montessori, 1966, Preface)

Freedom is a word that many educators choose to describe program goals and bases. For Montessori, freedom was the method:

> The concept of liberty in the education of the child in his earliest years must be understood as demanding those conditions adapted to the most favourable development of his entire individuality. (Montessori, 1964, p. 104)

This concept was actualized in what Montessori termed spontaneous activity. "It is necessary that the spontaneous activity of the child should be accorded perfect liberty" (Montessori, 1965b. p. 71). Thus, in order to be helpful to the child--in order to allow the child to be free--"it is necessary rigorously to avoid the arrest of spontaneous movements and the imposition of arbitrary tasks" (Montessori, 1964, p. 88).

Spontaneous activity is still "honored as a watchword but rarely reflects actual practice," says McDermott (1965, p. xxiv) and yet, as he goes on to say, "it is the dialectic between liberty and the demands of the environment that brings the child to self-realization" (McDermott, 1965, p. xxv). Actual practice of spontaneous activity finds the child "the center of activity, free to move about as he wills and to choose his own occupations" (Montessori, 1964, p. 111).

Boyd (1914, p. 213) states that this freedom is "the absence of interference with the processes of growth." At the same time, it is the presence of motives for movement and interaction. To Montessori (1967a) liberty is activity. It is an action verb. Like all action, Montessori's liberty has boundaries which define it. Because there is an environment, in strict logic, the pupil cannot really be free. Culverwell (1913) pointed this fact out; then he said that what is important is that the child feel himself or herself to be free: unhampered in choice-making. In strict logic, if Culverwell

is right, freedom would be negated as a possibility for any human being living in an environment. Yet, we purport to be free. And we tend to shape our environments to support that freedom. What is important is not that we feel free but that we be in control of and responsible for our own actions. To be free in the Montessorian sense is not only to act in appropriate ways, but to inhibit inappropriate actions: "Much of this method rests on that. There is on the one hand freedom to choose and be diligent, and on the other hand there is inhibition" (Montessori, 1967a, p. 262). The limit of liberty is the collective interest; its form: universally considered good breeding (Montessori, 1967a).

Cole (1950) describes the freedom of the child-centered Montessori classroom in terms of trade-offs, as it were, with a traditional teacher-centered environment. In the traditional environment there is forced immobility; in the Montessori environment immobility is attained through concentration on an interesting subject. The traditional environment controls through teacher pressure; the Montessori environment controls through peer pressure. In the traditional environment there is forced learning; in the Montessori environment there is spontaneous interest. What is <u>really</u> being traded? Child self-control is replacing teacher control. The Montessori child is taught to control both exhibitory and inhibitory behavior--necessary control for functioning in a free environment. Force and pressure in the traditional environment are

replaced with choice and responsibility for consequences in the Montessori environment.

Boyd (1914) claimed that a compromise was necessary if Montessorian freedom were to be functional. He was referring to Montessori's adamancy about servants not performing work that people could do for themselves. She believed that this created unnecessary dependency. Boyd felt that Montessori needed to recognize a necessary dependence, one not servile which facilitated a learning from others not destructive of personal effort and individuality. What Montessori's freedom takes into account is that unnecessary dependence is unhealthy. The goal of her method is to place an individual's actions under that individual's responsible control. All help received from others must be designed to facilitate personal effort and individuality, or it will result in destructive consequences. The child's abilities to move and to act become the vehicles by which appropriate movement and action may be learned.

Protecting spontaneity. Montessori believed that in schools dedicated to the defense of spontaneity

> prizes and punishments have no place . . . . if a child has to be rewarded or punished, it means he lacks the capacity to guide himself; so this has to be supplied by the teacher. (Montessori, 1967a, p. 245)

One of the greatest guidance structures of education has been schedules. It is interesting to note what Montessori says

about schedules. She writes (1964, p. 121) of a schedule that had been outlined in the first children's house but never followed entirely: "a sign that a schedule in which the material is distributed in arbitrary fashion is not adapted to the regime of liberty." Many schools have totally and rigidly planned days and weeks. These do not meet the truly differing needs of individuals. Just as great attention is given to individual needs in the preparation of materials from which children may choose, equally great attention must be given to flexible schedules which will defend the spontaneous atmosphere in which they are to be used. There are Montessori teachers who believe that a child's strongest academic inclinations are present only during the morning hours. They schedule the children's day based on this belief and plan easier tasks for the afternoon hours. In Montessori classrooms which are to leave the child's spontaneous manifestations alone so that the teacher may learn from them what the child does need and enjoy, how can rigid scheduling allow a teacher to find out that some of the children might be extremely adept at problem-solving of a more academic nature during the early afternoon hours or that children who do not enjoy Practicial Life activities in the afternoon might perform them with eagerness and precision in the morning?

Work

"External works are at once the means of attaining internal growth and an indication of it" (Montessori, 1974,

p. 307). Montessori defined work as movements directed toward a goal; its opposite meant disordered movements (Montessori, 1974). Work was, to Montessori, the key to liberty, and it was in work that the first glimmerings of discipline had their origin. But the quality of that work was very important:

> Work cannot be presented in an arbitrary manner, and this is what lies behind our method. It must be the kind or work that a man inwardly desires and for which he has a natural inclination, or which he can accomplish bit by bit. (Montessori, 1974, p. 305)

Discussion abounds today about work versus play and about the essentialness of play for an organism's development, be the organism human or animal. Play is often thought of with more "pleasure" connotations and work with "drudgery" connotations, despite the fact that we counsel our young to find vocations which are pleasurable to them. The point is, there are many ways in which human beings can and do behave. What is pleasurable to one might not be so to another. The same may be said of drudgery for one and another.

Montessori believed that directed activity which was meaningful to the individual was the only means for developing independence. The activities which she offered to the child aided the child's task of developing skills for the identification and utilization of the resources he or she needed for independence.

A Scientific Method of Education

"And herein lies the art of the educator; in knowing how to measure the action by which we help the young child's personality to develop" (Montessori, 1964, p. 231). Montessori (1964) indicated that a scientific education based upon objective research should be able to transform normal children by raising them up above the normal level of functioning. The object of a science of education was not only the observation which she repeatedly advocated, but also the transformation of children: "A scientific education is, therefore, one which, even though it is based on science, modifies and perfects an individual" (Montessori, 1974, p. 32). Today, I think we may say that the art of modification and perfection is possible because it can be based on science.

Montessori noted that classroom experimentation traditionally was not carried on by the teacher but by outside scientists (Montessori, 1964). To her, the practical progress of education demanded

> a genuine fusion of science and teaching--bringing scientists directly into the important field of the school and at the same time raising teachers from the inferior intellectual level to which they are limited. (Montessori, 1964, p. 4)

She called for true experimentation in education--to make of every school and classroom where the method was used a laboratory for experimentation (Montessori, 1974). The laboratory method was observation which had one fundamental base: "the

liberty of the pupils in their spontaneous manifestations" (Montessori, 1964, p. 80). Further, if a science of education were to exist, its origins would have to be in "active and modifying stimuli and not in stimuli used as measures" (Montessori, 1974, p. 183). In addition, "we must renounce all idea of making any record of internal states, which can be revealed only by the introspection of the subject himself" (Montessori, 1964, p. 72).

Montessori believed that an art of education could only result from a union of education and science. Though the method emphasizes observation, Montessori teachers are not trained to be scientific practitioners of their art.

Social Context

Rambusch (1958) wrote that "the very condition of learning in this Montessori environment depends on socialization as an atmospheric element" (p. 79). The Montessori approach has been misunderstood by some educators who feel that it provides too much structure and formality and too little socialization (Orem, 1971). Plank (1971) claimed that Montessori lays less stress on the interaction of children and the interaction between children and teacher than methods more accepted in America. Kilpatrick (1914) did not view the Montessori situation as adequate for social cooperation, though he espoused the same basic goal as Montessori.

> What we wish, then, is to put children into such socially conditioned environments that

> they will of themselves spontaneously unite into larger or smaller groups to work out their life-impulses. (Kilpatrick, 1914, p. 20)

Evans (1971) expressed surprise that although

> Montessori defined social life as a continual process of solving social problems, during which one must behave in concert with other people and cooperate in striving toward goals desired by the social collective (p. 51),

the method is considered to be at variance with the concept of group adjustment.

Not only is social interaction respected, but it is the modus operandi of the Montessori Method. "What we must take seriously . . . is her fundamental vision of the living context in which learning takes place" (McDermott, 1965, p. xviii). Yet, there is also the potential resting in the method itself for stifling just such interaction by the requirement of protecting individuals from intrusion. Braun (1971, p. 14) states, "The teacher insisted on one thing . . . : The child was not permitted to disturb others."

In the Montessori classroom, as in the larger world, there must be fostered a healthy interaction between individuals. This balance is not easily come by; nor does Montessori indicate how it can be accomplished. She acknowledged its importance, and she observed that it could and often did happen in classrooms which used the Montessori Method. But it does not always occur.

Myths of the Method

Proof is not a necessity. Cole (1950) felt that Montessori's method was not rigidly scientific but was highly intuitive. Montessori, Cole believed, got her theory from a book and her practice from shrewd observation of human beings. Actually, Montessori's theory was an integration of her exposure to many books and courses on theory and philosophy and of shrewd observation of human beings. Cole's (1950, p. 572) statement that "Mme. Montessori's work needs neither theoretical nor scientific justification--and in the writer's opinion it would be better off without them" reinforces the circularity of claims about the method which too often come out sounding life "The method is good because it is good." The current level of scientific technology available must be stringently applied to Montessori settings to provide theoretical and scientific justification--or to illuminate those components of the methodology that might work to better advantage with some revision. The larger community has suffered by being deprived of such data. The Montessori subculture has not been "better off" without such a mirror in which to assess its image and its potential.

The Deistic teacher model. A key misinterpretation of Montessori Methodology is what I refer to as the fallacy of the Deistic teacher model. Montessori herself, as noted earlier, used a clock analogy to discriminate between traditional approaches to education and her methodology. For many

decades the analogy used to describe Deism--God the great winder then passive observer of the universe so set in motion--has existed in educated consciousness. How almost undetectable the error of a passive interpretation of the teacher role facilitated by the stimulus Montessori's analogy provides! Add to this the support that can be found among Montessori's own statements to provoke just such an interpretation. And then reinforce the Deistic thesis by interpreters and observers who see it that way, and voila!, the method has its hands tied before it begins. This is the greatest obstacle to the optimum functioning of the Montessori environment. Read some of the statements of the creator of the method:

> Once we have created an environment in which all the objects are attuned to children's developmental needs, we have done all that is needed to produce this phenomenon. (Montessori, 1967a, p. 244)
>
> So, after we have offered to the child such didactic material as is adapted to provoke the development of his senses, we must wait until the activity known as observation develops. (Montessori, 1964, pp. 230-231)

And, further, a real conundrum, that the teacher must never "interfere by praising a child's work, or punishing him if it is wrong, or even by correcting his mistakes" (Montessori, 1967a, pp. 244-245). What is a teacher to do? The teacher is to have a passive attitude and respect for the child's personality (Montessori, 1964). This is a teacher "without a desk, without authority, and almost without teaching" (Montessori, 1964, p. 111).

There are interpreters of the method who have furthered the theology of the castrated teacher:

> The Montessori teacher is advised to serve mainly as an observer, to give only indirect guidance, and to provide a well-ordered, stimulating environment in which the children are free to roam, talk, work singly or in groups, and learn by discovery. (Baines and Snortum, 1973, p. 313)

Ahlfeld (1970, p. 77) sees the didactic materials carrying the burden of instruction:

> Montessori moved the teacher or "directress" from center stage in the classroom to the background, where she functions primarily as a diagnostician, a link between the child and the materials, and a guide to helping each individual child pursue his own individual learning interests.

The use of the word "background" is ironic; the functions listed would tend, if anything, to place the teacher in even closer proximity to the child than a desk at center stage ever could.

Fisher (1913, p. 32) also asserts a passive motto for the adult educator:

> It is well to remember that the best thing one can do for the child is to let him alone as much as possible. "Hands off!" is the motto for adults in adopting the Montessori system for a child.

Boyd (1914, pp. 223-224) hits a different kind of note: "The only point that provokes question is whether Montessori does not underrate the part played by adult models." Mario, Montessori's grandson, harmonizes with Boyd's melody by

acknowledging that without guidance no single community can come into being: "Somebody must see to the maintenance of the patterns of behavior that are deemed necessary for ordered coexistence within a given group" (Montessori, 1977, p. 25). And Montessori herself certainly did not consistently cast the teacher in a passive role: "The teacher has become a director of the spontaneous work of the children . . . . The children are occupied each one in a different way" (Montessori, 1964, p. 370). The tasks this involves are numerous and active. Their aim should be to remove obstacles that inhibit the natural course of events, to promote insights that further it, and to help work these through (Mario Montessori, 1977). Further, a Montessori teacher is held accountable when her class becomes undisciplined: "The teacher sees in the disorder an indication of some error she has made" (Montessori, 1967a, p. 285). The teacher must "help the child to act, will, and think for himself" (Montessori, 1967a, p. 281). Culverwell (1913, pp. 221 and 234) very astutely observed,

> the teacher has her eyes everywhere, with a little word of public approval for whatever is well done . . . and correction or explanation for what is ill done. The Montessori teacher must study her pupils much more closely than the teacher who puts her faith in training the children to be obedient to commands rather than in letting them develop through their own spontaneities.

A passive interpretation of the teacher role will not allow a teacher to fulfill his or her duty "to direct a child's activities, sparing him useless efforts which would dissipate

his energies, divert his instinctive search for knowledge" (Montessori, 1974, Preface). A passive interpretation of the teacher role does not allow a teacher to maintain the patterns of behavior that are required to meet the Montessorian goals. Montessori spoke of the personal art of the educator as though it were greatly varied from individual to individual. There is evidence from the results which Montessori recounts in her works that she herself possessed great art as an educator. As Cole (1950, p. 574) wrote, "To a considerable degree Madame's great skill in teaching offset the weaknesses of her system, whenever she was doing the actual teaching." It is with this in mind that we move on to Chapter 3 to look more closely at what the teacher is and is not.

CHAPTER 3

MONTESSORI'S TEACHER

The Need for a Great Art

Rambusch (1965) pointed out that Montessori would not separate the importance of the environment from that of teacher. She also acknowledged that in Montessori's time and in her time--and I would add, in our own time more than ever--the teacher is the transforming element in Montessori's educational approach. That would seem to place greater emphasis on the teacher than on the environment. The teacher can know how an environment should work; the environment cannot "know" how a teacher should work. It can only be designed by the teacher in such a way that it provides the necessary support for arriving at the specific goals. But the teacher has duties to perform and qualities to exude which go far beyond the mere structuring of an environment. "The teacher must not limit her action to observation, but must proceed to experiment" (Montessori, p. 90).

This teacher is to be a humble admirer of the child's work, growing into a mature and successful adult. He or she must be of neutral (calm) character and spiritual humility, and intellectual purity--these are necessary antecedents to understanding a child. (Montessori, 1966) If children are to be aided, the teacher must learn to distinguish between bad and good behavior: "to distinguish between acts which should be prevented and those which should be observed"

(Montessori, 1974, p. 51). More passive than active, the teacher should exhibit an anxious scientific curiosity and a respect for the phenomena he or she wishes to observe. "It is imperative that a teacher understand and appreciate his position as an observer" (Montessori, 1974, p. 50). Like the dedicated scientist, the teacher is to be self-sacrificing: "What we call encouragement, comfort, love, and respect are actually a drain on one's soul . . . . Without such an inner effort, the most perfect external stimulus passes unnoticed" (Montessori, 1974, p. 27).

In addition to those qualities which a teacher must possess are the behaviors he/she is to exhibit in order to fulfill Montessori's description. The teacher must not disturb the child but will serve like a follower of this person who is growing up. And, yet, there is a distinction between the educator and the servant that must be observed: the educator helps the child to help himself or herself. The servant does the work for (or to) the child (Montessori, 1974). The Montessori teacher, then, is not a servant of the child's body to wash, feed, and dress, but to "help the child to act for himself, will for himself, think for himself; this is the art of those who aspire to serve the spirit" (Montessori, 1964, p. 89). The child must receive stimulation from the teacher, then be left free to develop, to unfold: "Herein lies the first task of the educator" (Montessori, 1964, p. 115). The teacher must be a catalyst between the child

and the environment prepared for his or her education (Montessori, 1974). The primary duty of the teacher is "to assist the child to perform useful acts" (Montessori, 1974, p. 57).

> Not in the service of any political or social creed should the teacher work, but in the service of the complete human being, able to exercise in freedom a self-disciplined will and judgment, unperverted by prejudice and undistorted by fear. (Montessori, 1967b, p. 3)

In order to facilitate the required freedom, Montessori's teacher must organize even more thoroughly than teachers in the ordinary schools (Montessori, 1967a). As Rambush states, the guiding principle of Montessori's work is that "liberty for the child operates as a clearly seen complement to organization of work by the adult" (Rambush, 1965, p. 22). Liberty for the child also demands that lessons be given individually (Montessori, 1974) with the outcome of this liberty being that the teacher "may end by standing almost completely aside" (Montessori, 1967a, p. 244).

The kind of encouragement, love, comfort, and respect Montessori herself felt toward children and expected her teachers to exhibit is inconsistent with interpretations such as Edmonson's (1971) which describe the Montessori teacher as one who merely observes, explains, and clarifies, but does not divert and does not establish a personal relationship of feelings with the child. Edmonson finds this in direct

contrast to non-Montessori teachers who feel their role is to

> note children's moment to moment experiences--emotional and social as well as their discoveries of concepts relevant to the physical and natural worlds--and to reflect shared pleasures, acceptance of regression and to be of help in times of an excess of negative feelings. (Edmonson, 1971, p. 75)

Actually, Edmonson renders a good description of the quality of observation and interaction required of a Montessori teacher. No doubt many teachers who fit this description exist both inside and outside the Montessori community.

Montessori said, "A superficial judgment of the Montessori Method is too often that it requires little of the teacher, who has to refrain from interference and leave the children to their own activity" (Montessori, 1963, p. 86). The kind of relationship which Montessori observed between teacher and child appears to draw on resources far beyond those which the method provides in training teachers:

> Just as soon as a teacher has touched the hearts of each one of her pupils in turn, awakening them and calling them to life as if by a magic wand, she will have possession of those hearts, and a sign or word from her will be sufficient since they are all aware of her presence and listen to her.
>
> There will come a day when the teacher, to her own great surprise, will notice that all the children obey her like gentle little lambs, not only prompt to respond to any suggestion from her, but even waiting for it. They regard her as one who gives them life and from whom they instinctively hope to receive even more. (Montessori, 1974, p. 111)

Having this much power over children is basically a frightening

idea. Montessori does not explain how this happens or why it does not always happen or what to do with it when it does. What becomes apparent as one delves more deeply into Montessori theory is that the teacher potentially has more power in this methodology than in other methods.

> Accordingly the new task of the teacher of the future is a multifold one. He is the artificer of human beauty, the new modeler of created things, just as the sublime chisel of Greek art was the modeler of marbles. And he prepares for greater utilization the physiological and intellectual forces of the new man, like a Greek deity scattering broadcast his prolific riches. (Montessori, 1913, p. 360)

Method, she felt, was always more or less mechanical. What was needed was not a method, but a master (Montessori, 1913). Montessori's Method demands a teacher who

> is not an educator, he is a creator; he must have been born with special gifts, as well as to have perfected himself for this high task. He ought . . . to be handsome in person, and strong as well, so that he may attract and yet command; his glance should be serene, like that of one who has gained victories through faith and has attained enduring peace; his manner should be imperturbable as that of one not easily persuaded to change his mind. In short, he ought to feel beneath him the solid rock, the foundation of granite on which his feet are planted and his steps assured. From this solid base, he should rise commandingly, like a magician. His voice should be gentle, melodious and flexible, with bursts of silvery and resounding eloquence, but always without harshness. (Montessori, 1913, p. 449)

Montessori goes on to say that the teacher should educate his or her own voice, speech, and gestures and should take a

course in facial expression and declamation like a great actor preparing to win a public (Montessori, 1913).

There must exist in the role of the adult, then, one who is extremely effective in interacting with and leading other human beings, who is motivated out of love for them, who knows when to intervene and when not to intervene, who is able to support the child's spontaneous actions and transform them for good, who is able to construct and maintain a supportive environment for these activities, and who is able to facilitate a child's positive interactions with it. Montessori's requirement is an under-statement: "For such a delicate mission there is need, however, of a great art which will suggest the proper time and limits of one's interventions" (Montessori, 1974, p. 111). From where does this "great art" come? The teacher must

> fashion herself, she must learn how to observe, how to be calm, patient, humble, how to restrain her own impulses, and how to carry out her eminently practical tasks with the required delicacy. (Montessori, 1974, p. 151)

Montessori's teacher must have a clear idea of two factors which enter into her world: the guidance of the child and the individual exercises. Montessori indicated that only after this concept was clearly fixed in the teacher's mind could the teacher proceed to the application of a method to guide the spontaneous education of the child and to impart necessary notions to the child (Montessori, 1964).

Training the Montessori Artist

Finding that a "physical plant without a clear-cut set of operating instructions is worthless," Nelson (1978, p. 4) reacted to his experiences by writing a manual for Montessori teachers. This appears to be the first attempt to remove some of the obstacles to the teacher role in a way other than a selection of some of Montessori's own statements about it. Nelson (1978) indicated,

> All my "training" . . . had been for functioning when everything is going smoothly and by-the-book . . . . What nobody bothered to inform me of was that having things go smoothly and by-the-book is by no means a naturally-occurring state of affairs, but rather a teacher-based accomplishment. (p. 4)

A survey of self-perception of role and skills of Montessori teachers (Calvert, 1978) from the three major Montessori teacher training programs (Association Montessori Internationale, American Montessori Society, and St. Nicholas) resulted in findings which indicated that Montessori teachers show many across-training-program similarities, but they also show statistically significant differences--and none live up to the ideal Montessori teacher the author of the study composited from Montessori's writings. Calvert's study demonstrates that a part of the problem in training the Montessori teacher evolves from beliefs that Montessori herself articulated about such training--and which, apparently, the ideal Montessori teacher is still expected to espouse, if the statements and their ratings on Calvert's questionnaire are

any indication. To the statement "Training of a teacher consists chiefly in the training of her spirit" (p. 79), "Strongly Agree" was the correct answer. To the statement "It is possible to train a person to be a skilled observer" p. 80), "Strongly Disagree" was the correct response.

Montessori felt that teachers must, like their students, learn by doing. Self-preparation was to her, the key. Montessori devised materials and environment especially for the refinement by self-teaching of children's skills. Her teachers, however, were left floundering. Calvert's study has, hopefully, wedged a small pick in the iceberg. And yet, one wonders how many Montessorians even know about it. And, of those who do, what significance they attach to it. For example, a report of this study's findings in the National Montessori Reporter stated that there were

> no significant differences between the various groups in categories such as (a) teaching skills (b) teaching preparation and (c) role perception. In addition Ms. Calvert's studies seemed to indicate that training courses are based on modified Montessori teaching with teachers being trained somewhat differently than Maria Montessori envisioned. (1978, p. 5)

There is no evidence that Calvert's challenge to further explore the teacher role and teacher training has been acknowledged. But it is a valid challenge and could provide a tremendous resource for improving the method in the area of teacher preparation and practice. Either what Montessori envisioned was correct or it was not. What training programs

are producing as artful educators should either approach a consistent model, or the programs should be examined to analyze the differences and to determine how they correlate with attainment of the goals of the method.

As pointed out earlier, Montessori was not consistent in her descriptions of how a non-intervening teacher was to behave. It is no surprise to find that training programs have different outcomes. It is no wonder, with the problem of the quality and availability of Montessori literature referred to before, and with the time compression of training programs, and with the availability of the beautiful didactic materials, that many programs stress learning to use the didactic materials and afford only a very brief exposure to Montessori's philosophy, and then have trainees spend "practice" time in a classroom setting. Earlier, reference was made to "Practice makes perfect;" however, repetition of incorrect practices only serves to entrench their incorrectness. Quality feedback is an important--and seldom present--component of training programs.

Culverwell's (1913) reaction to the Montessori-designed apparatus, registered at a time when purchasers were restricted to buying all or none of the didactic materials, applies equally well to the dominance they hold in many training programs. Such dominance

> may tend to strengthen the idea, the most dangerous of all to the success of the method, that the secret lies in the

> apparatus, the whole appratus, and nothing but the apparatus, whereas it really lies in the intelligent and untrammelled application, by the teacher, of the principles on which the apparatus has been designed. (p. xvi)

Culverwell also pointed out that to Montessori the principles were everything. "Material inventions can be adopted from another country, without modification and without thought, but great mental principles cannot be applied without corresponding mental effort" (Culverwell, 1913, p. 8).

Schill and Omwake (1971) stated that even if training were to concentrate on Montessori's own psychology and pedagogics, there certainly is more that teachers of young children should know.

When the chips are down--like Nelson (1978) noted they are at times--and the classroom is utter havoc, Montessori says of the teacher, "Only her intelligence can solve the problem which will be different in every case" (Montessori, 1967a, p. 268). She acknowledges that "To prepare teachers in the method of the experimental sciences is not an easy matter" (Montessori, 1964, p. 7). She felt that scientific training of the teacher should result in an interest in and an ability for observing natural phenomena (Montessori, 1974).

> If pedagogy is to take its place among the sciences, it must be characterized by its method; and the teacher must prepare herself, not by means of the content, but by means of the method. (Montessori, 1965b, p. 130)

The teacher's preparation must result in him or her being made "worshippers and interpreters of the spirit of nature" (Montessori, 1964, p. 10). The interest in humanity of the educated teacher was to be characterized by the intimate relationships between the observer and the individual observed (Montessori, 1964, p. 12). Montessori (1964) claimed that there was a path of development for a teacher to learn to follow in order to guide children. This path consisted first of preparation of the imagination; second, visualizing a child not yet there and having faith in the child's self-revelation through work of interest; and, third, waiting for concentration. This path was to be accomplished by the teacher being the guardian and custodian of the environment and placing full focus on it and not the child; materials were to be in perfect order and appearance. If the environmental custodian could be attractive and young and beautiful, charmingly dressed, scented with cleanliness, happy, and graciously dignified, so much the better (Montessori, 1964). And in the case of children not yet interested in the results of her custodial endeavors, "the teacher needs to be seductive, and can use any device--except of course the stick--to win the children's attention" (Montessori, 1963, p. 87).

Montessori apparently believed that "To observe it is necessary to be trained" (Montessori, 1963, p. 131). The trained observer, like the self-wound child, begins to feel interest, which becomes, then, the motivation for continued

observation (Montessori, 1963, p. 131). The acquisition of this observational skill, however, was a matter of exposure to the condition of observation. "Now it is obvious that the possession of the senses and of knowledge is not enough to enable a person to observe; it is a habit which must be developed by practice" (Montessori, 1963, p. 130).

Montessori felt that the first requirement of the teacher was a right disposition for the task. The teacher must not be prone to anger, pride, tyranny, or authoritarianism. Nor must he or she abstain from judging and thereby approve everything a child does. The development of the child's mind and feelings must not be neglected by the teacher. And "a teacher should never forget that he is a teacher and that his mission is one of education" (Montessori, 1966, p. 153).

Despite the tremendous demands made on the teacher, Montessori offered no special techniques to her students. She felt that in this holy art of the spirit they could not be trained but must educate themselves (Rambusch, 1965, p. 14). Montessori could verbalize this self-preparation of the teacher as one requiring guidance: "We must be taught and we must be willing to accept guidance if we wish to become effective teachers" (Montessori, 1966, p. 149). Further, she could say of creating observers of young children, "We cannot create observers by saying 'observe,' but by giving them the power and the means for this observation" (Montessori, 1964, pp. 228-229). But to her mind, as noted before, mere skills

were mechanical. In teacher preparation it was the spirit that was to be emphasized (Montessori, 1964, p. 9). As far as practice of the method, she actually wrote, "I believe that the portion of our method here described is clear enough for teachers to put into practice" (Montessori, 1974, p. 319).

That Montessori impressed those with whom she came in contact with her dedication and enthusiasm and the results of her employment of scientific methodology is apparent. But when it came to educating teachers with the care with which she had educated children, or with anywhere near the process with which she had educated herself, Montessori did not follow through with the same attention to detail she exhibited in planning for the education of young children.

> But let us put aside the difficulty of preparing scientific masters in the accepted sense of the word. We will not even attempt to outline a programme of such preparation, since this would lead us into a discussion which has no place here. Let us suppose, instead, that we have already prepared teachers through long and patient exercises. (Montessori, 1964, p. 11)

The discussion of such preparation must have an appropriate place somewhere. Supposing "that we have already prepared teachers" is inadequate preparation for the active--not passive--role they are to assume. If Nelson and others like him are any indication, this sin of omission on Montessori's part was visited upon her followers and subsequently on "their" children.

Effective educational training programs of any kind are largely lacking in today's world if the goal is to turn out researchers capable of scientifically assessing and evaluating the environments in which they teach. How many teachers know, beyond the grossly misinterpreted M & M dispensing or token-economy environments, what transforming behavior through applying behavioral principles is all about?

No matter how dedicated a teacher is, if she/he lacks the skills necessary to manage his/her own interactions and those of the classroom, success has only a trial and error chance. I firmly believe that Montessori herself practiced some of the skills involved without identifying them or attending to their impact. Success in human relations always has its roots in the principles that govern them with or without participants' awareness of these principles. Nelson's Bag of Tricks (1978) includes many behaviorally sound strategies without identifying why they work or that they have been empirically validated. Teachers must inadvertently employ them in positive directions to arrive at those peak days when they can say, "Everything was perfect!" Why, as soon as one day later, can the world suddenly fall apart? But, it can, and it does. The important thing is that there are ways and means for finding out what makes good things tick and then maintaining that kind of operation. That appears to be what Montessori could do but what she did not teach others to do.

The method, then, is incomplete. Montessori expended thousands of words to describe an experimental approach to education of the young. She emphasized that the dedication and the attention to detail that personify a scientist should characterize the Montessori teacher in the classroom. This teacher, it appears, cannot be trained, yet must be trained. Concern in training was, for Montessori, with training the spirit. Yet, who can see the spirit? Montessori herself said that we must attend to what can be observed and not rely on introspection. Who can deny that there are those who love and would serve young children sacrificially? This love is evidenced in actions. And it is in the interest of providing a structure for those actions to be spent in positive directions for the child that we turn to examine more closely the manner of intervention, weaving into it some of the fibers of social learning research and identifying some of the principles of behavior upon which operating instructions for a beautifully conceived physical plant might be based.

Montessori has carefully planned the laboratory for the intervention; she has described the foundations on which it must be built and has defined the goals to which it aspires. We turn now to look more carefully at the behavior of its scientist.

CHAPTER 4

SOME SHAPING TOWARD A MORE CONTRIVED MANNER

The Montessori Opportunity: A Naturalistic Training Situation

The "new" teacher Montessori envisioned, deprived of the desk which traditionally had provided the pivot point of teacher-student interactions--not to mention a material demarcation of difference between teacher and student--was now thrust into the midst of the students. The students themselves were freed of desks in support of spontaneity and mobility. Thus, the social milieu that is the Montessori environment was created: one which both facilitates and depends upon human interactions. The Montessori environment, because it is a microcosm of the larger world, can be called a naturalistic training situation--one in which individuals spontaneously learn from one another in the course of their daily interactions. It becomes of critical importance, then, for the teacher to understand the principles that influence interacting in this kind of social learning context and to apply them strategically to arrive at the goals that are set.

> In view of the frequent occurrence of both deviant- and non-deviant-modeling cues in naturalistic training situations, delineating the variables that predict their effectiveness seems to have considerable importance.
> (Allen & Liebert, 1969, p. 260)

Contriving a natural setting. Nelson (1978) appreciated the necessity of the contrived nature of a successful intervention which was noted earlier.

> Having my model even get the chance to see the light of day involves my orchestrating a series of experiences for each child which will illuminate the system, win the child over to this way of doing things, and train him in how to operate effectively within such a system. Like it or not, this process is a manipulative one--and has to be . . . . Some clues as to stratagems that might work are desperately needed by a host of floundering teachers and parents who seek something better but don't know how to get there. (pp. 3 and 6)

What it is important to be acutely aware of is that the stratagems under discussion here must be employed to facilitate and support the required freedom and spontaneity for the child's developing independence and responsibility. It is very easy to manipulate the same stratagems toward any ends.

Behavioral systems approaches. Behavioral systems approaches to early education have demonstrated that any content a teacher selects can be taught if there is the opportunity to learn, the existence of necessary prerequisite behavior, and the motivation for acquisition (Homme & Tosti, 1973). One such approach (Bereiter & Engelmann, 1969) hypothesized: "Children are taught at different rates. If the rate of teaching is increased, the children will perform at an above-normal level" (p. 30). The rate of teaching was increased with specific directions to govern the teacher's behavior in an intervention program which operated two hours per day. The result was that the disadvantaged children in the study were accelerated by three years in reading and math skills and further, that gains typically demonstrated to be greater during the first year and less in the second year

of intervention for preschoolers were just as great in the second year with the intervention model employed. The authors concluded that the general failure in the public schools is a function of inadequate instruction.

Another such approach to preschool education (Homme & Tosti, 1973) stated as its objective the production of "super child." This system was defined as not natural, but designed, deliberate, and engineered. Super child meant, first of all, the acceleration of normal development of cognitive and social skills. For example, four-year-olds could do sixth grade reading and math and three-year-olds could display the cooperative abilities of well-mannered ten-year-olds in their play. The second characteristic of this super child was deemed by the authors to be the more intriguing. There are many desirable behaviors which are listed as expected outcomes of conventional programs, but which are only infrequently acquired under normal conditions. These include positive self-image, joy of learning, happiness, independence in learning, positive social image, etc. Though these are included as goals for many early childhood programs, they are not normally defined as behavioral objectives; nor are they specifically designed for in conventional education. To the creators of super child, these are objectives to be obtained in a deliberate and planned fashion. It is the purposeful management of contingencies which allows attainment of the stated goals. The authors claimed that this system of management could apply

to any content selected.

Advanced learning versus acceleration. Montessori was an educator who was concerned that her system of education be based on the child's needs as evidenced by his/her choices and not on a teacher's arbitrary assignment of tasks. Though many supporters make claims about the advanced learning experienced by the Montessori student, acceleration has never been a direct goal of the method. If it is a by-product of the goal of quality independence and responsibility that Montessorian spontaneity and freedom support, well and good. It is not a goal, per se. Montessori's deliberate engineering was aimed at designing an environment in which the child could make choices about what and how fast to learn and accept responsibility for the consequences of these choices. As Nunn (1923, p. 90) expressed it, the cardinal feature of Montessori's teaching is "her courageous and resolute attempt to throw upon the child as completely as possible the responsibility for his own education, and to reduce external interference with his development to a minimum." It is in the interest of protecting the child's right to act spontaneously and responsibly that contingencies must be managed in the Montessori environment.

Contingencies in any event. The point I wish to emphasize here is that no matter what the environment, or its goals, there are always contingencies at work. If the spontaneity and freedom of an intervention for responsible

independence based on non-interference and self-education are to be a reality, then certainly contingencies must be managed to provide support for such an educational structure. If they are not, they may accidentally inhibit arrival at the stated goals.

> There is a choice, then. Either one manages the contingencies or they will get managed by accident. Either way, there will be contingencies, and they will have their effect. That is a sobering thought--that these laws of behavior, which we have to assume are as powerful as any other laws of nature, are usually ignored and left to chance. (Homme & Tosti, 1973, p. 49)

The truth of the matter is that contingencies are usually not intentionally managed. They just happen. When a day goes poorly, different tricks are employed--or maybe more punishment is meted out, creating unhappiness for teachers and their students. If a day goes well, there seems to be a hesitancy to hamper the euphoria with "why's?" for fear the bubble will burst. Such days are enjoyed with a sigh of pleasure and relief until things crumble again.

A difficult task. The reason for all this concern about managing contingencies is that it is not a simple task; further, it has been demonstrated that the hardest behaviors to change are those which have been reinforced intermittently. "Persons whose response patterns have been reinforced only intermittently will persist in their behavior for a considerable period of time despite setbacks and infrequent

reinforcement" (Bandura, 1969, p. 29). It is an intermittent pattern of reinforcement that describes the continuum of a classroom calendar composed of bad and good days. Thus, there is little likelihood that teacher behavior will change in the direction of creating more positive days--and consequently creating a more consistently success-provoking environment for children--merely by reading about some of the principles which govern human interactions in a social learning context. There is ample literature available already to facilitate this transition if literature alone were sufficient to evoke change. What is needed is a quality intervention into teacher training to shape the required knowledge and behavior. Before an intervention will occur, however, some thinking must go into why it is needed.

Some thoughts about the needed intervention. One of the purposes of this book that was stated in the "Foreword" was to provide some impetus for forward motion. Thus, the remainder of this chapter will introduce Social Learning Theory and will discuss some of the principles of social learning as they relate to human interactions in the Montessori environment. It is hoped that the identification of this relationship will provide a potential base upon which those who are teachers and those who are concerned with training teachers might rationalize paying a greater amount of attention to the area of teacher behavior to the end that teachers might be more effective models for and facilitators of the responsible independence envisioned by Montessori.

Social Learning Theory

Who. Albert Bandura, currently a professor of psychology at Stanford University, has been more responsible than any other individual for the existence of a theory of how human beings learn in ordinary social life. He and Richard Walters, one of his students, began examining various theories of learning with a goal of developing a comprehensive account of human learning. Since Walters' death in 1968, Bandura has continued to pursue research on the principles of learning under the very general heading of "behavior modification" (Cartwright, 1979). A large portion of this work has been carried out with children (Bandura, 1969). An important focus of this research has been, and is, how an individual's behavior can be facilitated, extinguished, or inhibited by direct involvement in a social interaction or through vicarious participation in it.

What. Unlike other theories which merely describe, Social Learning Theory is an "applied" theory. Bandura (1977) has updated the definition of the human activity known as theorizing in his demand that "theories must demonstrate predictive power. They must accurately identify the determinants of human behavior as well as the intervening mechanisms responsible for the changes" (p. 5). What Social Learning Theory does is to isolate, define, apply, and continue to research and evaluate the antecedent, process, and consequence variables which reciprocally influence the

formation and modification of human behavior, within and across actual or vicarious social interactions. Social Learning Theory has concerned itself with the application of the principles of learning in a strictly social context and reflects the maturity of psychological science to date (Cartwright, 1979).

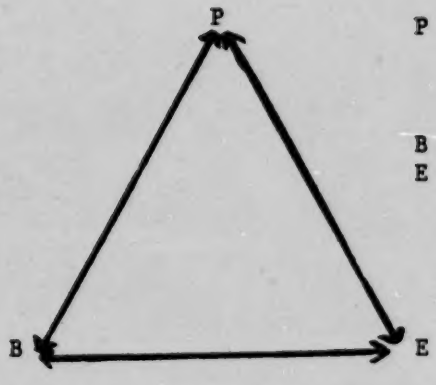
Bandura and Walters (1965) called Social Learning Theory a socio-behavioristic approach to identifying and understanding the determinants of human behavior and the mechanisms for behavioral change. They indicated that it is rooted in and experiences growth from controlled investigations in child development, social psychology, anthropology, sociology, and clinical and psychiatric resources. What all these resources have revealed is that "a single set of social-learning principles can account for the development of both prosocial and deviant behavior and for modification of behavior toward greater conformity or greater deviation" (Bandura & Walters, 1965, p. 32). What has also been revealed is that "social behavior patterns are most rapidly acquired through the combined influence of models and differential reinforcement" (Bandura & Walters, 1965, p. 5).

When and where. Cartwright (1979, p. 516) has evaluated Social Learning Theory as developed by Bandura and his associates as presenting "the best integrative summary of what modern learning theory has to contribute to solutions of practical problems."

In addition to numerous applications in traditional classrooms, social learning principles have been applied to help institutionalized and out-patient mental health clients to solve their problems (BAM Project, Note 11). They have been utilized in a model for family strengthening in a social learning approach to youth problems (Coombs, Eckman, Santana, and Swenson, In press). The work of Rosenstein and Swenson (in press) is a recent innovative application of social learning principles to the problems of aging.

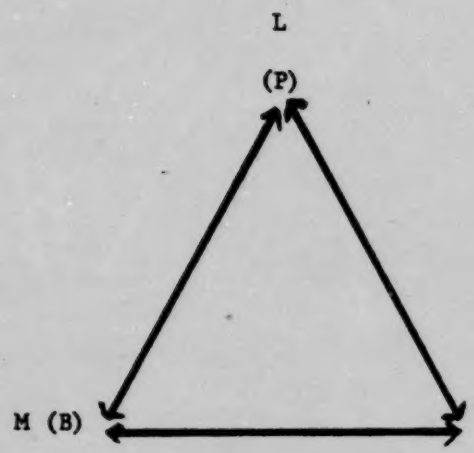
Why Montessori and Social Learning Principles?

The body of research which is now known as Social Learning Theory concurs with the nostalgic old adage "no man" (or, less old, "no man or woman") "is an island." Put in social learning terms, "both people and their environments are reciprocal determinants of each other" (Bandura, 1977, p. vii). Bandura points out that Social Learning Theory acknowledges a "continuous reciprocal interaction between cognitive, behavioral, and environmental determinants" (1977, p. vii). He has diagrammed this concept of reciprocal interaction (Figure 1, p. 125). The tripartite curriculum demand of the Montessori Method provides a structure for each learning experience consistent with Bandura's description of human functioning (Figure 2, p. 126). Attention has also been called to the reciprocity of human interaction that the Montessori Method facilitates in that there is "a mutuality of directing and being directed between child and guide" (Mario Montessori,



P = the cognitive and other internal events that can affect perceptions and actions
B = behavior
E = external environment

Figure No. 1 - Bandura's Reciprocal Interaction Schema
(Bandura, 1978, p. 345)



(P), (B), (E) are defined in Figure No. 1

L = Language acquisition

M = Motor behavior

S = Sensory experience

Figure No. 2 - Montessori's Tripartite Didactic Intervention: Consistency with Bandura's Reciprocal Interaction

1977, p. 116). As stated earlier, however, what is not provided by Montessori is adequate guidance for such mutual interaction within the structure of the method. Montessori's theoretical demands on scientific methodology as applicable to education, however, reflect her strong desire for theories to demonstrate predictive power. Had she lived for another quarter of a century, I am sure that she would have been profoundly influenced by what strategies Social Learning Theory might provide to enhance the predictability of attaining her method's goals.

Toward a Responsible Independence

Intrinsic and extrinsic motivation. Rambusch (1965) wrote:

> Learning for one's own sake, to meet one's own criterion of success, was what made learning satisfying to the child, Montessori maintained. "Help me to do it myself" was the message she had received from countless children. (p. 11)

The kind of learning that Rambusch writes of may be said to be intrinsically (internally) motivated, or child-controlled.

> A person is described as intrinsically motivated if he performs an activity for its own sake and extrinsically motivated if the activity is performed as a means to an end, that is, to obtain a reward or to avoid a punishment. (Ross, 1975, p. 245)

Researchers have demonstrated that external rewards can decrease intrinsically motivated behavior and can increase externally motivated behavior (Calder & Straw, 1975).

Montessori (1967a) claimed that when a child feels

confident, he/she will no longer seek praise (external reward) after every completed step of an activity. This kind of self-confidence or self-satisfaction appears to be an outgrowth of intrinsic motivation. It is evidence that the individual has taken over the role of administering his or her own reinforcers, or that his or her motivation is intrinsic: self regulated.

> When an individual perceives his performance as having met some standard of adequacy, he is thought to make a self-evaluative response which may serve as, or lead to, reinforcement. (Hildebrant, Feldman, & Ditrichs, 1973, p. 1)

Individuals perceive their own motivations as less self-controlled when they believe that external rewards are extremely appealing (Ross, 1975).

Self-regulation. In his analysis of how individuals react to their own behavior, Bandura (1978) points out that

> Self-reactions . . . vary depending on how people perceive the determinants of their behavior. They take pride in their accomplishments when they ascribe their successes to their own abilities and efforts. They do not derive much self-satisfaction, however, when they view their performances as heavily dependent on external factors. (p. 349)

An important factor in judging one's behavior to be self-regulated is the evaluation of the activities one performs:

> People do not much care how they perform on tasks that have little or no significance for them. And little effort is expended on devalued activities. It is mainly in areas affecting one's welfare and self-esteem that favorable performance appraisals activate personal consequences. (Bandura, 1978, p. 349)

Individuals respond self-critically to inadequate performances only when they hold themselves responsible, and it is this sense of responsibility that results in the self-evaluation and self-consequating of behavior. In the social learning view, self-regulated (intrinsic) incentives alter performance mainly through their motivational function. Self-regulatory processes, however, are always first learned under conditions of extrinsic motivation. This in no way detracts from the fact that, once established, self-produced influences operate as contributory factors in the regulation of behavior. By their own actions, then, individuals can partly determine the nature of their experiences. Through their capacity for manipulating symbols and engaging in evaluative processes, people are able to generate novel ideas and fashion new environments for themselves and others. (Bandura, 1978)

It is the goal of the Montessori Method to assist the young child with a successful acquaintance with the symbols and processes which facilitate the interactions of the human community and to involve the child from the very first moment of intervention with evaluative processes. The purpose of this acquaintance and this involvement--the Montessori "preparation for life" (Montessori, 1967a)--is to insure that the individual will have a part in determining the nature of his/her experiences. If the matter of extrinsic or intrinsic control is left to chance, an individual may never develop self-regulatory behaviors. The Montessori Method, combined

with the principles that govern social learning, provides a theoretical intervention model for facilitating the child's acquisition and performance of the self-regulatory behaviors which lead to independent and responsible human functioning.

The Montessori Method is theoretically both dependent upon and facilitative of social interaction. It is through social interaction that imitative learning occurs. What this means in Social Learning Theory terms is that each individual in the environment is both a potential model for all other individuals to observe and a potential observer of all other potential models (Figure 3, p. 131). The word "potential" has been intentionally overused. It will remain only potential unless the variables which influence its actualization are understood and effectively manipulated within the learning environment.

Montessori and Imitation

In many languages the synonymity between the words teach and show is literal (Bandura & Walters, 1965). In the Montessori environment, teaching the didactic materials is showing; children are shown how the didactic apparatus are to be used. Through imitation of what is shown, a child learns. Montessori was extremely aware of the imitative capabilities of young children: "Let us treat them, therefore, with all the kindness which we would wish to develop in them . . . . They will imitate us in any case" (Montessori, 1967a, p. 133).

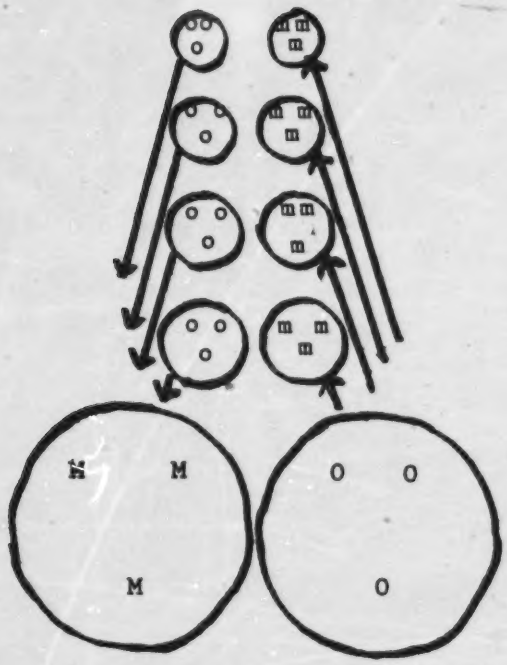


Figure No. 3 - Each member of the Montessori classroom community simultaneously wears two faces: that of observer and that of model.

Montessori was also extremely concerned that a developing child's individuality might be inhibited by imitation. "Our task," she said, "is to show how the action is done and at the same time destroy the possibility of imitation" (Montessori, 1967b, p. 15). Boyd (1914) noted that there was inconsistency in Montessori's maximization of imitative potential. Montessori would teach napkin-folding skills to a child but not art skills, he pointed out, because she did not want to make the children copy anything. Boyd (1914, p. 226) indicated that it was necessary to, and he did, raise the ultimate question: "The question that must ultimately be raised is whether it is possible for children to learn anything at all without imitating those who are their superiors in wisdom and experience." Hosford (Note 8), in summarizing relevant research, has indicated that in the experience of young children imitation is probably the most common process of learning. Yet, Montessori's frequent mistrust of imitation can be taken as a warning.

Nunn (1923) called an observer's unwilled adoption of another's ideas "suggestion." Nunn claimed that one of the thorniest questions of professional ethics for the teacher was how to use suggestion. A teacher cannot, proposed Nunn, prevent himself or herself from influencing a student any more than he or she can become invisible in the classroom. Nunn stated that suggestion is not, by nature, a foe to spontaneity, but a necessary instrument in the process of development.

It follows that the teacher is as much entitled to influence his or her pupils as they are to influence one another, provided it is not imposed on them but a part of the common stock from which they draw. (Nunn, 1923)

Ault (1977) provides a clearer understanding of the role of imitation in the Montessori environment when she writes that "imitation is an important tool in learning, readily observed in children" (p. 180) but immediately cautions against two misinterpretations in the exploitation of the imitative potential. The first is the instance in which a "star" is held up for the emulation of another: "Why can't you act like . . .?" Ault reiterates Montessori's position of spontaneity clarifying that appropriate imitation is child-initiated and derives from the observing child's desire to acquire a skill that is displayed by another child (model). The second caution (Ault, 1977) is that imitation must not result in the rejection of the importance of individual differences or creativity. Ault's cautions are helpful in determining a constructive role for imitation in the Montessori environment.

Though creating stars (or competitors) is inappropriate in the Montessori environment, teachers should be aware that calling attention to exemplary models by way of inviting children to note the positive consequences of their behavior (or merely by publicly consequating appropriate behavior) is an extremely effective method of shaping desirable behavior. It

should be noted, however, that calling public attention--or private attention--to negative behavior and its results can only plant the potential for negative behaviors to grow. (Bandura & Walters, 1965) Montessori herself made note of the teacher's public attention to children's positive behaviors: "The teacher calls attention with little exclamations to a child who is clean, a room which is well ordered, a class seated quietly, a graceful movement, etc." (1964, p. 123).

The proper role of imitation. The role of imitation is not to create similarity among children but to foster--help, not hasten--the learning of skills that is accomplished more slowly through direct tuition or through trial-and-error learning by the individual himself/herself (Ault, 1977).

Many years before the importance of imitation was supported empirically, Montessori intuited its potential and, though hesitant at times, depended on it for the success of her method. She admonished teachers to respect useful activity which she described as using material "in exact imitation of the way" the child has learned it from the teacher, or in some similar way that would show the child's intelligence at work (Montessori, 1974, p. 134). Cole (1950, p. 585) made note of the impact of imitation in the Montessori environment: in terms of inculcating order in newcomers, "the strong imitative faculty of little children came into play. Example achieved what, no doubt, precept alone would have failed in

doing." Boyd (1914, pp. 222-223) rendered a particularly accurate description of the role of imitation in Montessorian learning:

> In those cases where anything specific has to be learned it is almost invariably learned by imitation either of the teacher or of the more advanced scholars. That is to say, the impulse to perform socially valuable acts does not come directly from the teacher's suggestion, but results from the instinctive desire of the children to do what they see others doing. They observe the performance of certain actions, and even without a proper understanding of their significance they are eager to follow the example set and to repeat the actions for themselves.

Boyd's observation caused me to stop short one day when I considered taking a counting activity using unit beads and ten bars away from a two-and-a-half-year-old who had not been teacher-instructed in its use. Instead, I asked the child if he knew how to do the exercise. He grinned and shook his head in the affirmative and kept on working. Though he could not explain the procedures to me, he manipulated the materials attempting to make tens out of units as he had seen older children doing--and feeling extremely proud of his accomplishments.

An environment for imitation. The spontaneous nature of the Montessori environment theoretically maximizes the opportunity for imitation to occur. Montessori recognized imitation at work in early learning and instructed that a teacher must set an example for the child to follow. Braun (1971) noted that Montessori's teacher was "truly an observer of nature who set an example for the child" (p. 14). Though

Montessori was aware that intervention by the teacher might be necessary to instruct a child in the use of the materials, she also noted the impact of children's learning from one another. In the case of instructing a child to use the Cylinder Blocks, the teacher's "intervention . . . is almost always unnecessary, for the children see their companions at work and thus are encouraged to imitate them" (Montessori, 1965a, p. 69). In the children's use of the Red Rods "it will often happen that the child learns, not directly from her [the teacher] but by watching his companions" (Montessori, 1965a, p. 75).

Montessori's delimitation of imitation. Montessori (1974) observed that in the formative period of early life, there is a kind of perfect obedience; she claimed that the outer manifestations of this obedience had been evaluated as a "tendency to imitation" (Montessori, 1974, p. 171). Beyond this tendency to imitation, she observed in the human organism "a natural tendency to adapt to other human beings" (Montessori, 1974, p. 172). She believed, however, that this tendency to imitate or adapt was limited to early development. Later on, "except in noteworthy instances that must be attributed to supernatural assistance, there will not be found that same kind of obedience, but simply a reasonable adherence or a forced submission" (Montessori, 1974, p. 172).

Montessori's interpreters, however, did not perceive

this limitation in the outcomes of the method. Nunn (1923) stated that imitation displays itself in action, feeling, and thought. Imitation of an admired mistress, he pointed out, for example, could begin with handwriting and end with a wholesale adoption of sentiments and opinions. "The admirer tends to become like the model, so to speak, all through" (Nunn, 1923, p. 123). Cole (1950, p. 574) perceived just such a likeness between Montessori and the students of her methodology:

> It has been said that a child who was exposed to nothing but the Montessori Method during his preschool and school years would emerge as an individual cast in the same mold as Mme. Montessori herself: scientific, precise, objective, accurate, unemotional, independent, rigorously individual,

hardly a reasonable adherence or a forced submission.

Some supernatural assistance. What Montessori observed to be "noteworthy instances that must be attributed to supernatural assistance" are really instances--in early and later human learning--which now are more clearly understood. Researchers have demonstrated that there are measurable influences at work in the interactions of human beings which, when understood, can be utilized for designing strategies for more predictable outcomes for human behavior. The success of the Montessori Method is dependent upon the social interactions of its imitative learning environment. Montessori teachers, however, are not trained in the skills which will provide the required transitions from social interactions to imitative learning.

Learning by Observation and Imitation

Any environment where two or more people gather has potential models, observers, and imitators. A model is someone or something capable of demonstrating a behavior or a concept. An observer is one who watches a model. An imitator is an observer who matches (imitates) a model's behavior, but that process does not deprive the imitator of his or her own uniqueness; rather, it provides an opportunity for developing it.

> It is as if the observer makes a personalized template or pattern or blueprint of the observed behavior and later reconstructs the behavior in his or her own style, enlarging or expanding this or that aspect according to individual learning history. (Geiwitz & Moursund, 1979, p. 233)

The social context of the applied Montessori Method requires the presence of potential models and observers. Montessori depended upon a child's capabilities for imitation for the method to be successful. However, there is not inherent in the method any guarantee that imitative learning will occur. Understanding that there are known factors which influence imitative learning can provide a foundation for building into the Montessori Method a guarantee that imitative learning will occur.

The components of imitative learning.

The Model

Much learning today still occurs through interactions with physically present, three-dimensional models; however,

advances in technology and written and audio-visual means of communication are resulting in increased reliance on the use of symbolic materials (Bandura & Walters, 1965). The use of symbolic materials often begins very early in a child's educational career, despite empirical validation of the young child's need to manipulate three-dimensional objects. The Montessori Method still respects this need and presents three-dimensional representations of abstract processes and concepts (the didactic materials) via human models.

Bandura and Walters (1965) identified three effects of the observation of models: (1) observational learning; (2) the strengthening or weakening of responses; and (3) response facilitation (cueing). These effects occur whether imitative behavior is spontaneous or intentional. Relevant research indicates that when a model is provided, patterns of behavior are typically acquired in large segments or in their entirety (Bandura & Walters, 1965) if the factors which influence this acquisition are working for and not against it.

The Observer

All individuals are not observers. Observation occurs only when an individual is interested enough to pay attention to a model whose behavior he/she is able to understand and interpret to some degree (Bandura & Rosenthal, 1966). This interest and attention are dependent upon such factors as whether or not the model is perceived by the observer to hold social values and standards similar to those of the observer

(Berger, 1971) and whether the model is similar enough in competence to the observer (Bandura & Whalen, 1966). The model's prestige as perceived by the observer is also an important factor (Bandura, 1969). Perception of a model as self-controlled rather than externally (teacher-) controlled also influences an observer's interest and attention (Clement, Note 6). How the observer interprets the consequences to a model's behavior is also influential (Bandura, 1969).

The Imitator

Assuming that a sufficient number of influences has drawn the interest and attention of the observer, there are additional factors which determine whether or not the behavior observed will be imitated. If the observer perceives the consequences of a model's behavior as positive, he or she is likely to spontaneously reproduce the model's behavior (Bandura, 1969). Barnwell's (1965) findings have implications for the teacher in the Montessori multi-age-group setting. He found that first graders were most affected by consequences to a model administered by an adult. Third graders were more influenced by consequences administered by a peer; these included self-administered consequences of a peer model. If consequences to a model's behavior are interpreted by the observer as negative, imitative behavior will decrease; it will not, however, be eliminated (Bandura, 1969).

Consistency between a model's words and actions is also a significant influence on imitation (Hildebrant, et al.,

1973; McMains & Liebert, 1968). Regardless of consequences to a model, it has been found that positive incentives to an individual for performing matching responses influences performance rate (Bandura, 1965; Kennedy, 1970, 1971). When both observer and model are positively rewarded for performance, responses are greater and are maintained longer (Bandura & Walters, 1965). In most instances, incentive control of observing behavior can override the effects of variations in observer and model characteristics.

Acquisition, Performance--and Learning

Bandura and Jeffrey (1973) revealed that the acquisition of observed behavior is a function of attention and symbolic (not externally observable) retention processes. Performance is regulated by actual motor reproduction (rehearsal) of a behavior and verbal and symbolic processes (cues). Neither acquisition nor performance, however, is a guarantor of learning.

The Three R's of Social Learning

Retention. Observationally gleaned information, to be of use, must be stored in an easily retrievable structure (Giewitz & Moursund, 1979). The most successful structures appear to be systematic codes comprised of verbal labels or pictorial sequences which can be triggered by external cues. Symbolic and/or behavioral rehearsal of stored information aids retention.

Reproduction. Reproduction (imitative behavior) is facilitated by consequences to the model observed and by direct verbal instructions to the observer to remember what is seen (Yussen, 1974), as well as by consequences to the observer for reproducing the model's behavior. These consequences include clear instructions to the observer. Researchers have found that in the absence of instructions about what is expected and why, behavior is imprecise and often markedly different from what might be expected within a given situation (Baron, Kaufman, & Stauber, 1969). Instructions have the consequence of producing the kinds of differentiated behaviors that might be appropriate within a particular situation. Baron, et al. (1969) found that instructions were even more effective when combined with actual exposure to a practice situation from the very start of training.

In order for behavior to be reproduced, there must also be provision for rehearsal with adequate cueing and a high quality of feedback. Quality of feedback is contingent upon making note of and commending the reproducer for specific correctly performed behaviors. In the case of incorrectly performed behavior, mere re-modeling and suggestion may provide sufficient cues for correction, or it might be necessary to further incrementalize designated components, model appropriate behaviors in connection with them, then again provide for rehearsal, cueing, and feedback. Such an incremental procedure is called "shaping."

Reinforcement. Reinforcement includes the consequences of reproduction listed above as well as the positive feedback which maintains competent performances over a long period of time (See "Schedules of Reinforcement," Appendix A).

Practice, Cueing, and Feedback in the Montessori Environment

Montessori (1974) noted that merely observing the behavior of others was insufficient for learning: "A child must acquire the customs prevailing in his environment. That is why he must have an opportunity to exercise himself in them. It is not enough that he see what others do" (p. 305). Montessori (1965) believed that practice perfected in the child the capacity for distinguishing fine differences and thus "we leave him alone to his attempts" (p. 84). She indicated, however, that the child is not really left alone; suggestions (cues) can be made to guide the practicing. Researchers have found that observers who use verbal cues have been found to acquire more matching responses than passive observers or observers whose attention is interfered with by a verbal or symbolic distraction (Bandura, Grusec, & Menlove, 1966). Montessori exercises (Appendix H) are presented with verbal cues and visual cues (points of interest) in an environment which intentionally minimizes distractions; the structure of the exercises, with their isolation of quality or difficulty, aids in keeping symbolic interference to a minimum. There is evidence that what a model says is processed by the observer whether or not it is directly

imitated; however, the tendency for young children to emit verbal behavior is contingent upon familiarity with either its content or its form (Bloom, Hood, & Lightbown, 1974). The child's spontaneous choice of activities should facilitate such familiarity and enhance the child's use of verbal behavior for cueing during practice. In this context, it would be worth pursuing the finding of Coates and Hartup (1969) which indicated that four-year-olds gained in imitative performance when aided by verbalization, but seven-year-olds did not.

The opportunity to practice, as Montessori (1964) envisioned it, was to be, among other results, facilitative of developing the ability to recognize one's own mistakes. She felt that this must be planned for in education just as much as instruction and materials on which to work. "Controls of error"--"any kind of indicator that tells us whether we are going toward or away from our goal" (Montessori, 1967a, p. 248)--were very carefully built into the didactic materials. "Reliable guidance and the possibility of checking as we go, are the indispensable conditions for getting anywhere" (Montessori, 1967a, p. 248). The reason for the attention to control of error is, in Montessori's words: "I need to know whether I am doing well or badly" (1967a, p. 248).

Unfortunately, Montessori (1974) also indicated that the verbal instruction of traditional education was in her method replaced by material for development with its own control of

error. Feedback has been emphatically left up to the material and the child. The teacher's importance in this process of letting a child know whether he/she is doing well or badly has been stifled, except that Montessori (1967a) indicated that a child should be praised ungrudgingly when praise is sought. The human element in the feedback process must be attended to with as much care as that given to the materials; if it is not, actions might be misinterpreted by the child.

Montessori describes dealing with a child's error: "Let us suppose that the child in following the last direction makes a mistake. The teacher does not repeat and does not insist; she smiles, gives the child a friendly caress and takes away the colours" (Montessori, 1964, p. 109). According to what is known about feedback and reinforcement at this time, the teacher's smile and friendly caress and lack of attempt to model and verbalize the correct response leave much to be desired in this interaction if it is to be a learning interaction. The smile and caress are likely to indicate to the child that the response made was correct--and further to reinforce the incorrect response, thus increasing the likelihood of its being repeated on a future occasion. If in the instance of correct responding by the child the teacher behaves in the identical way (with a smile and a friendly caress), this exposes the child to an inconsistent external standard of control which could result in his/her adoption of a lenient standard for self-regulation (McMains & Liebert, 1968;

Hildebrant, et al., 1973).

Montessori paid great attention to incrementalizing the didactic materials and providing cues via points of interest and controls of error at each important sequence of an activity cycle to keep a child on target toward a successful goal. In monitoring the use of the materials, and in maintaining the practice environment that supports their use, the teacher must also provide a consistent quality of feedback. The consistency and the quality of the standards upon which the Montessori teacher bases the feedback which consequates a child's behavior from his/her very first interactions with the environment will be extremely influential in determining the quality of self-reward criteria which the child adopts for his/her own standard.

The Consequences of Behavior

Inasmuch as Montessori has been interpreted most often as anti-reward or punishment, the following passage is of interest:

> In everything that we say about rewards and punishments we do not intend to discount their basic, educational import, but only to check their abuse and perversion so that instead of being means they become as it were an end. As a matter of fact, common sense tells us that rewards and punishments are a means for knowing practically . . . that a work is good or evil, praiseworthy or reprehensible. Thus in a certain sense they are inseparable from work as effect is from cause. (Montessori, 1974, p. 15)

Many people believe that reinforcement is some sort of material reward for behavior. The much-reknowned M & M's and dollars

for A's on report cards describe this perception of reinforcement. Actually, reinforcement is "any event or stimulus that follows a response and is valued by the recipient, thereby leading to an increase in the future strength of that response" (Sarason, Glaser, & Fargo, 1972). A hug or a kind word might be as effective as (or more effective than) M & M's. The key is how the recipient values the reinforcement. And the point is that reinforcement which is valued by the individual receiving it increases the frequency of the response which brought it. In the Montessori environment which both requires and fosters imitative learning, it is important for a teacher to understand that once imitative responses occur, the consequences to the imitator will largely determine whether they become stronger, weaker, or inhibited (Bandura & Walters, 1965).

Montessori's natural and unnatural consequences. Montessori (1964) distinguished between unnatural and natural consequences. She considered prizes and punishments to be incentives toward unnatural or forced effort; thus, she did not believe that one could speak of the natural development of the child in connection with them. She offered an analogy to describe the resulting freedom of natural consequences versus bribes or punishments:

> The jockey offers a piece of sugar to his horse before jumping into the saddle, the coachman beats his horse that he may respond to the signs given by the reins, and yet neither of these runs so superbly as the free horse of the plains. (Montessori, 1964, p. 21)

Culverwell (1913) introduced a dimension beyond Montessori's analogy; he answered why the free horse of the plains runs so superbly: "Because a thousand enemies lie in wait for the 'free' horse; if he does not run superbly he perishes in the inexorable context of nature" (p. 298). It is precisely to this place--where one must responsibly encounter the ultimate contingencies which shape the uniqueness of an individual life only through that individual's own decision and action about them--that Montessori wished to bring individuals. Daily practice in encountering natural contingencies provides an incrementalization of the ultimate, and it is in the consequating of these early day-by-day encounters that teachers play their most important role in influencing a child's decision-making capabilities. If control is to be placed in a child's own hands, then natural consequences must be observed. A very simple example of this might be that if Erin accidentally upsets a glass of water, there is water to be mopped up. The teacher helps to shape this into a natural encounter by merely observing that it is wet and must be wiped up, by showing a child how to wipe it up, and by discussing possible causes of the spill which, attended to, might prevent such occurrences in the future. The arbitrary assignment of an unrelated task--sitting on a bench, for example--is not a natural consequence of such an occurrence. It is very important to understand that reinforcements--prizes and punishments, social and material--<u>do</u> have their effect in the development

of the individual from an observer to an imitator to a self-regulated human being capable of providing an appropriate model for others.

Tradition's distaste for rewards and today's research. Individuals responsible for the lives of the young have for years expressed dislike of the idea of material rewards. Culverwell stated the position in 1914: "We are . . . likely to create a craving for the pleasure or excitement given by the reward" (p. 299). Glynn (1970) addressed the fact that there is confusion in the minds of educators on the use of extrinsic reinforcers in the control of children's classroom learning, because there is fear that students will become dependent upon them. This objection, he notes, is addressed to identified token reinforcements. Yet, as he points out, it is hard to imagine a classroom where there is no praise or no reprimand. And aside from a few exceptions like Montessori's Method which theoretically devalues them, it is hard to locate an educational system which does not use promotions, diplomas, and other such material tokens to mark progress along a trail of independence most generally extrinsically ordered and controlled. The merits of reinforcement are questioned by lay and professional individuals who have an intuitive distaste for the rather mechanical conception of human action that seems to be implied (Estes, 1972).

Feingold and Mahoney (1975) raised the question of whether or not extrinsic reward would undermine children's

intrinsic interest. They found that a consequence of token reinforcement to children who had previously engaged in certain behaviors voluntarily dramatically increased the performance rate of those behaviors. Lepper, Greene, and Nisbett (1973) tested the effect of extrinsic reward in an educational setting and found that unexpected reward increased the interest of children who were categorized as "low interest" children. They also found that expected reward decreased the interest of both high and low interest groups and had a negative effect on the quality of performance. The authors interpreted their findings as indicative that a token economy type of reinforcement would be helpful when the initial level of intrinsic interest in an activity is low and some extrinsic device is essential for producing involvement with the activity or when the activity is one whose attractiveness becomes apparent only through engaging in it. Montessori obviously intuited that there would be such times and indicated that the teacher must seduce the student to arouse the cycles of involvement and interaction that would promote self-reinforcement. But she also perceived that once-wound and self-regulating, the student must not be interfered with by the teacher. Lepper and Greene (1975) in a study which replicated the findings of Lepper et al. (1973) regarding the decremental effect of expected reward also found that adult surveillance was sufficient to produce a similar decrement in subsequent interest in an activity. Glynn's (1970) study redressed the

complaint that extrinsic reinforcement is the same thing as external control of behavior.

> An alternative to a teacher laying down explicit acceptable standards of performance for classroom learning might be the provision of access to reinforcement on the basis of standards determined by individual children. (p. 131)

If learners can self-administer extrinsic reinforcers, then independence on external control is not a problem.

Reward and the Montessori environment. The individualized approach of the Montessori Method provides an optimum opportunity for honoring a child's own standards while facilitating the child's introduction to the processes of selection, employment, and evaluation of relevant reinforcers for his/her self-control. Indeed, the goal of the method is a high quality of self-control.

In the case of the normal human learner, a reward does not necessarily strengthen, nor a punishment weaken, the response which produces it (Estes, 1972). It is not that simple, because the individual has other information to draw from about the likelihood of the same relationships occurring on future occasions. What becomes important, then, in the very earliest intervention, is the establishment of consistency in the relationship between standard and reward. One perception that the work of social learning researchers would support (Estes, 1972) is that human beings, when permitted to do so, satisfy their own standards of performance. In this

context it is interesting to reiterate the story of a conversation between a visitor and one of Montessori's young students. The visitor had commented that the Montessori Method was the method where the children could do as they liked. The child addressed the visitor: "Excuse me . . . I do not know if we do as we like, but I know that we like what we do" (Montessori, 1966, p. xvii).

Children who experience a relationship with a high standard setting model (the Montessori teacher) who promotes a non-dependent relationship and who receives social reinforcement for behavior based on these high standards appear to set high standards for themselves if peer models also exemplify the high standards. These standards hold up even in the absence of any social surveillance and under conditions of high-permissiveness for self-gratification (Bandura, Grusec, & Menlove, 1967). There is evidence that inhibitions and self-controlling responses may be acquired through observational learning without the mediation of direct positive or negative reinforcement (Bandura, et al., 1967).

The quality of standard for self-reward is partly dependent upon prior training in how to judge and set standards of performance (Bandura, 1978). Glynn (1970) points out that "the ability to apply self-determined reinforcement is strongly influenced by the standards of externally determined reinforcement previously experienced" (p. 131).

Weaving the First Threads of a Quality Independence

Two periods of early learning. Montessori distinguished two periods in a child's early learning. She spoke of them as before concentration occurs (BCO) and after concentration occurs (ACO). These might also be differentiated by such terms as before imitative behavior appears and after imitative behavior appears. In the BCO period, Montessori (1967a) gave the teacher latitude to do pretty much as she or he pleased; it really did not matter. She or he can do what he or she likes because this upsets "nothing very important, so a bright manner in suggesting activities is the chief necessity" (Montessori, 1963, p. 88). But, ACO, the teacher was to "act as if the child does not exist . . . . If, as she passes the teacher merely says, 'Good,' it is enough to make the trouble break out all over again. Quite likely it will be two weeks before the child takes an interest in anything else" (Montessori, 1967a, pp. 279-280). Montessori's reference to the BCO period as a troublesome one in this instance indicates that she must have encountered some of the grief that Nelson (1978) experienced when he said that all of his training had been for when everything goes smoothly (ACO). Actually, there are two crucial concerns here that must be examined. The first is that BCO must become C (concentration) and the second is that ACO there must be maintenance of C. Or, quite simply stating a very complex process, how can behavior be shaped, and, once shaped, how can it be maintained? It matters very much what

the teacher does--both BCO and ACO! The mere presence of models is not sufficient magic to induce the transition or keep it alive.

From BCO to ACO: Shaping. When the potential observers are in the BCO state, "not cooperative or not interested in imitating the behaviors of the model, then a shaping procedure may be needed to obtain the necessary attention" (Schwitzgebel & Kolb, 1974, p. 127). "Shaping appears to be most successful when it is done with enthusiasm and with a positive attitude" (Schwitzgebel & Kolb, 1974, p. 57). Montessori did observe that "Every action of the teacher's can become a call and an invitation to the children" (1967a, p. 278). The point is that the same interactions which when performed blindly and without order inhibit the attainment of goals, when ordered appropriately can be the means of attaining them, to paraphrase Montessori's (1965a) statement about the influence of physical acts in the care of children (p. 24 of Chapter 1 of Chapter IV). "The directress," Montessori wrote, "must intervene to lead the child from sensations to ideas--from the concrete to the abstract, and to the association of ideas" (Montessori, 1964, p. 224).

What is the teacher's role? At the beginning of the intervention, then, the teacher must establish himself/herself in the role of model and shaper (Appendix I). Successful shaping as indicated earlier, amounts to breaking a skill into its component parts and exposing the learner to a

sequential experiencing of them (rehearsal, cueing, and feedback) with the progression to a more difficult component contingent upon mastery of the preceding one. Montessori (1974, p. 305) indicated that the work of a child must be work inwardly desired, work toward which a natural inclination is exhibited by the child, or "it must be the kind of work . . . which he can accomplish bit by bit." Further, a child must be taught "to coordinate all of his movements so that he can carry them out in a harmonious fashion, analyzing them as far as we can and perfecting each one of them individually" (Montessori, 1974, p. 306). Montessori (1965a) renders an excellent description of what this dual role of model and shaper means when she describes the child's initiation into the sense of touch:

> The teacher must always take an active part the first time; not only must she show the child 'how it is done,' her interference is a little more definite still, for she takes hold of his hand and guides it to touch the surfaces with the fingertips in the lightest possible way. She will make no explanations; her words will be rather to encourage the child with his hand to perceive the different sensations. (p. 78)

There is, in this shaping procedure, first of all the observing child whose teacher must be aware that the child's rate of acquiring matching responses through observation will be largely determined by the extent to which the necessary component behaviors already exist in the observer's repertoire (Bandura, 1965). Then, there is the material model which embodies an abstract concept and a human model who identifies

a behavioral structure for gaining access to this resource and physically (in this instance) introduces the child to the structure. There is also verbal cueing which calls attention to the sensations experienced, and all this would be followed by an invitation for the child to rehearse (practice) with the materials. It has been demonstrated that immediate rehearsal with self-cueing is a more effective learning procedure than delayed rehearsal which merely serves to indicate what has been retained (Bandura & Jeffrey, 1973); this is certainly facilitated in the Montessori Method for teaching the didactic materials.

Montessori (1965a) cites many other instances of such teacher modeling and shaping in the use of materials. In the areas of learning not dealing with specific materials, she also describes the teacher's role. In the Lesson of Silence "the teacher, then, does not limit herself to say, 'sit still,' but she gives the example herself, showing them how to sit absolutely still" (Montessori, 1965a, p. 118).

The teacher is also acknowledged as a model for correct verbal behavior in speaking and singing (Montessori, 1965a) and is admonished to pronounce clearly and completely the sounds of a word in speaking to a child and when teaching songs to pronounce slowly, separating the component sounds of the words.

Maintaining desired behavior. Assuming that the teacher carries off her modeling and shaping roles effectively,

numerous other models of appropriate behavior should soon flood the classroom. But, actually, the method quits at this point. Montessori (1965a) says that the instructions of the teacher consist merely in a hint, a touch--enough to give the child a start. She also indicated in such an instance as the use of the Red Rods that "one day the child will (by chance, after practice) arrange the rods in their right order" (Montessori, 1965a, p. 76). What is missing here is the quality feedback discussed earlier. As the child begins to exhibit appropriate acquired behavior, this behavior must meet with positive consequences or it will not be maintained, much less progress to the point of a child's own control over it.

It is this kind of minimal intervention, lacking a quality of consequation, which appears to be close to the type of experience which Kilpatrick (1914) felt was provided by the Montessori Method when he pointed out that Montessori's system relied on the didactic materials for auto-education, kept the teacher in the background, and did not, in effect, consider the abundant instances of evident self-education found in life itself.

> A boy driving a nail soon learns whether he is hitting it on the head. A pair of roller skates suggest their own problem with a minimum of explanation; they also test admirably the solution proferred. (Kilpatrick, 1914, p. 34)

There is a point to be made here—one inconsistently acknowledged by Montessori and apparently not known to Kilpatrick. That is

that the procedures of shaping via modeling, rehearsal, cueing and feedback can--and do--save many thumbs, arms, and legs and at the same time facilitate the success and confidence which shape a child's feelings of competence and result in appropriate actions--actions which must then be consequated if they are to be maintained as a base for quality independence.

Consequating Inappropriate Behaviors

Montessori's negative imitation. Montessori (1967a) observed that there were times when things did not go smoothly because the children would imitate inappropriate models. She called this "negative imitation." Such useless and dangerous acts "must be suppressed, destroyed" (Montessori, 1964, p. 88). It was her suggestion that if things got totally out of hand, the materials should be removed. If it is true that children find these materials reinforcing, then certainly this constitutes an aversive or punishing consequence and will result in some of the undesirable consequences of aversive measures which will be discussed in the next section. A valid question to be raised for consideration here is: Is it the materials that cause the negative imitation?

Further remedy for negative imitation was left for the teacher to ferret out by trial and error. In the case of negative imitation

> it is for her (the teacher) to judge whether it is better for her to raise her voice amid the hubbub, or to whisper to a few children, so that the others become curious to hear, and peace is restored again. A chord played loudly on the piano may end the discord like a whiplash. (Montessori, 1967a, pp. 267-268)

Another remedy was reverting to early exercises, such as moving furniture noiselessly, to cure disorder (Montessori, 1967a). In dire cases where the whole classroom is imitating negative behavior, Montessori suggested

> general surveillance and individual teaching, given with precision, are two ways in which the teacher can help the child's development . . . . In this period she must take care never to turn her back on the class while she is dealing with a single child. (Montessori, 1967a, p. 270)

Consider for a moment an instance of one child reaching over with a spoon from a dry-transfer exercise and striking the surface of the water in the pitcher of a liquid-pouring activity that is another child's choice of work at the same table. The activity of the water when displaced in this manner might be a very appealing sight and sound to small children who are not yet acquainted with all the expectations for the handling of materials. The children's delight might well draw the attention of others and soon a myriad of negative imitators will be proving that any container's liquid contents multiply when no longer contained! By not reacting immediately, the teacher allows the children to be reinforced by their game and by each other, and such an activity is likely to be repeated. Intervening proactively, the teacher would have, when the children were using their materials properly, consequated that activity with positive reinforcement and feedback to the children for their use, making much less likely the possibility of misuse.

Montessori (1963) indicated that if two children quarrel, the teacher should wait for an invitation before intervening. Rambusch (1958) relates an example of Montessori's non-intervention model for the teacher in such an instance. The names have been added here for interest. Alice is being pushed off a stool by Jimmy. Janet asks Alice if she has considered kicking him. Alice does kick Jimmy and retains her place on the stool as Jimmy walks away crying. Rambusch claims that the Montessori teacher would let the children work it out. By not intervening, however, the teacher makes an intervention that allows the contingencies at work to shape less than desirable behavior in this and future instances. Alice ends up being reinforced for kicking. Jimmy has been hurt but might try a similar strategy himself at some future date. Janet has found that she can tell other individuals what to do, that her advice works for others, and that it might work equally well for her. The observers in the classroom have potentially learned the same things. What an immediate verbal and modeling intervention might do for Jimmy, Janet, Alice, and the other children in the classroom is provide an appropriate way for Jimmy to request the stool from Alice--and an appropriate way, negative or positive, for her to respond to the request, as well as a proper response for Jimmy to either a positive or a negative answer by Alice. Involving all three children in a rehearsal of the proper behaviors would provide a positive model for their future

actions as well as a model of appropriate behavior for the onlookers. The three children become instructed models who, after rehearsal, may then role play for others, and their activities become a model for their own future behavior as they receive reinforcement for observing and imitating and for modeling (Bandura & Walters, 1965). It is necessary that the teacher respond consistently to all of children's behaviors.

> We may conclude that success yields increased probability of the correct response only if the stimulus feedback generated by the response signifies to the learner that the given response will have the same consequence on future occasions. (Estes, 1972, p. 725)

Montessori (1974) spelled out very detailed techniques for lessons with the didactic materials in her requirements for isolation, exact work, the assistance which a teacher should give in modeling the use of the material for the child, rousing the attention by being an enthusiastic model, and preventing errors in use of the material to insure its benefit to the development of the child's intelligence. No less care should be given the social milieu in which these lessons are carried out, and in which the teacher is the model as well as the maker of other models in her behaviors of shaping, cueing, giving feedback, and consequating the results.

Some Consequences of Punishment

Montessori (1964, 1974) discussed her concept of isolation--what is today called "time-out" or benching. It amounted to immobilizing a child by placing the child in a child-

sized armchair with all the objects he or she desired and from which companions could be viewed. Montessori told of her response to an isolated child:

> I myself whenever I came into the room would go first of all straight to him and address him as if he were an infant. Then I would turn to the others and interest myself in their work as if they were men. (Montessori, 1964, p. 103)

According to Montessori, the child became calm, the discipline worked, was lasting, and the child always showed a tender affection for it. Considering the individuality of human responding, it is highly possible that isolation as described here might have different results with different children. For example, the immobility in Montessori's isolation might be experienced by a very active child as a very negative or punishing consequence to whatever behavior it was that triggered the isolation. This would result in aversive conditioning which suppresses but does not eliminate behaviors (Bandura & Walters, 1965). The result might be generalized inhibition of other than the punished response.

> The teacher has punished me in this classroom. I hate it and her and I'm not coming to school any more. Besides she embarrassed me by treating me like a baby in front of all my friends.

The emotional responses established through aversive conditioning may motivate highly undesirable behavior patterns which are difficult to reverse. These may include avoidance of the teacher which would inhibit her/his facilitation of the child's future learning and which would negate his/her potential

effectiveness as a model.

Another potential result of Montessori's isolation might be an escalation of the behavior which triggered it. Some of the components of this isolation Montessori described could be very reinforcing to a child seeking attention: a special place, friends to see, objects that one desires, and special treatment by the teacher like that which would be given a child who had an illness. These might indeed have a calming effect and promote positive feelings toward the teacher for some children.

Active confiscation of privileges is another consequation of behavior likely to result in the side effects associated with aversive training procedures. And it is extremely important to understand that in a social setting, punishing consequences to any one individual may have similar aversive consequences to individuals who observe the interaction. An example of such vicarious impact of punishment became very clear to me one autumn some years ago when our daughter, then a happy, school-loving entrant into third grade began, a few weeks into the semester, to express a dislike for going off to school in the morning. The dislike escalated shortly into vomiting. Her only explanation for her dislike and her vomiting was that the teacher yelled--not at her, but at other children. Discussion with the principal supported the fact that the teacher did yell. After all, he said, she was from New York and was used to having to yell. Pursuant discussion

with the teacher about our daughter's perception of the situation resulted in an apparent reduction of yelling (which the teacher did not know she engaged in)--at least it resulted in a once-more-happy-about-going-to-school, non-vomiting third grade girl.

Montessori (1974) describes an intervention for preventing the misuse of material. The teacher will do this

> with the greatest sweetness if the child is calm and good-tempered; but if he shows a tendency to misbehave, she will check him with earnest words, not in a way that can seem to be a punishment for noise and disorder, but rather as an indication of her authority over the child. (Montessori, 1974, p. 153)

To Montessori this constituted extending a strong and friendly hand toward one who is weak (1974, p. 154). Yet, she also described a more consistent teacher model based on Seguin which required that under all conditions "calm, firm, and patient, her voice reaches their hearts in praise or exhortation" (Montessori, 1967a, p. 269).

Though punishment often results in immediate behavior change, it should be noted that such behavior change is rooted in negative ground. It is not behavior <u>for</u> in the positive--or proactive--sense that Montessori sought. It is, instead, behavior to defend the self against punishing consequences and the people who use them. Besides which, there is the disconcerting aspect of satiation at work here; as the child becomes satiated the amount of punishment must be

escalated. A story was told (Mayer, Note 9) about a teacher who favored time-out as a manner of dealing with less-than-desirable behaviors in her classroom. Isolation was, in this case, carried out by sending a child to sit on a chair in the office. The fact was that this particular child had been sent there so often that one day the teacher went home forgetting that he was in the office. That's a tough act to follow with another escalation in the amount of time spent in time-out. But it makes the point.

There's an Old Refrain Worth Singing

Bandura and Walters (1965) point out that withholding positive reinforcers (so simple a thing as verbal attention or eye contact) need have none of the disadvantages of aversive procedures. It amounts to putting inappropriate behaviors on extinction--ignoring the behavior, in other words. As has been demonstrated, behaviors are shaped incrementally with a great deal of attention. If they are ignored, they do not maintain. The immediate effect of inattention to negative behavior is probably that it will increase socially desirable responses that are aimed at reinstating reinforcement. This procedure, in contrast to aversive control, tends to maintain a favorable relationship between participants, thus leaving intact the model's influence. Though research has demonstrated the efficacy of dealing with inappropriate behaviors in this manner, it is not one that is new. Yet, it is seldom used.

There was a song that was popular when I was young. The words do not all come back now, but the song goes something like

> You've got to accentuate the positive,
> Eliminate the negative,
> Latch on to the affirmative,
> And don't mess with Mr. In-Between.

This is the formula that is needed for a free and spontaneous learning environment, capable of breeding responsible and independent human beings. The simplicity of its lines, however, does not reveal the difficulty of putting it to work. If it were part of human nature, interventions would not be necessary. As teachers--as human beings--we spend the largest portion of our time reacting. And it is very often the negative instances only that provoke our attention and result in our consequating of the behaviors of children, who come to know us as less than the ideal models we could be. This does not have to be the case.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

The purpose of this thesis was to call to the attention of both Montessori and non-Montessori educators the need for a more careful evaluation of the Montessori Method. This was done by providing a context for examining the Montessori opportunity in terms of some of the needs of education today and the potential of the Montessori Method for meeting some of those needs. It was pointed out that there is a lack of public dissemination of the method. One reason given for this was the belief of Montessorians that they possess the truth. They do not, however, have a consistent empirical validation of it; this has resulted in a cultish protection of the Montessori Method. It was further pointed out that the result of non-Montessorians' brief and fragmented encounters with and inconsistent perceptions of the Montessori Method have precluded their active pursuit of inquiry about the method.

For those less familiar with Montessori theory and methodology, an introduction to the method included brief statements of its goals and its conceptions of the role of education, the child, the environment, the materials, freedom, work, the scientific method Montessori desired, and the social context within which the method's goals and concepts must be implemented. It was emphasized that the Montessori social context is compatible with the social context of the larger human

community and thus constitutes a social learning environment where imitative learning occurs as models and observers interact. The introduction to the method also examined the teacher role and discussed Montessori's ambiguous descriptions of that role which have resulted in inconsistent interpretations and implementations of the methodology. This has caused less than optimum cohesion and consistency within the practiced method and has detracted from its attractiveness to outsiders. The examination of the teacher role further highlighted its importance as the crux of the method's successful fruition and demonstrated that application of principles of human behavior as derived from social learning research could bring clarity and consistency of manner to the teacher role.

Recommendations

Recommendations will be confined to the concerns indentified in this work. They are divided into two areas: "The Montessori Method" and "Montessori Teacher Training."

The Montessori Method.

To facilitate the objective exchange of knowledge and to increase interaction between Montessori and non-Montessori educators, the author recommends

1. that educators inside and outside of the Montessori Community develop valid empirical bases from which to evaluate the potential of the Montessori Method and
2. further that these evaluations be made freely accessible to both groups of educators. Such interaction

would require more involvement of Montessorians in the larger educational community and more involvement of non-Montessorians in the Montessori Community.

Specific areas of research which could provide opportunities for mutual inquiry and information exchange of Montessori and non-Montessori educators might include the following questions:

1. Does high mobility correlate positively with the outcomes Montessori listed?
2. In which triadic intervention does the child more effectively acquire and maintain knowledge and subsequently use it: the Montessori teacher-child-material intervention or that of the specialty teacher entering into the Montessori environment? Further, might the specialty be more effectively taught away from the Montessori environment if the philosophy and implementation of its teacher diverge from Montessori methodology?
3. Is rigid incrementalization and sequencing essential to the development of the qualities of observation, evaluation, and judgment?
4. Is rigid incrementalization and sequencing essential to the acquisition of cognitive constructs?
5. Would placing teachers trained in the arts of skillful intervention and interaction into Montessori's observational learning settings result in more consistent teaching strategies and greater attainment of identified goals than those exemplified in Montessori environments where teachers are not provided with such training?

6. How does the Montessori Method compare with other intervention models in successful attainment of similar goals?

Montessori teacher training.

The recommendations which follow for teacher training in the area of "Background training" are made with a view toward facilitating the exchange of information lacking between Montessori and non-Montessori educators. The writer believes that Montessori teachers who are better informed about education as a whole will be more secure in their own philosophies and implementations and thus more open to sharing and exchanging ideas. This is an area worthy of scientific investigation.

The recommendations which concern the didactic materials, personal communication skills, and techniques for observing and transforming behavior are meant to bring greater consistency to the role of the teacher as model and facilitator. The writer believes that this consistency will result in more predictable outcomes for teachers and children. This, too, is a prediction which should be examined scientifically.

Background training. In order to equip the Montessori teacher with an adequate base from which to make observations, comparisons, and judgments about Montessori methodology as it relates to the growing body of empirical data about learning and development, the author recommends that the content for a Montessori teacher training course include:

1. the range and content of non-Montessori philosophy as well as Montessori philosophy;
2. the history of education and of Montessori education as it relates to that whole;
3. developmental physiology and psychology as they relate to the child and to Montessori's theories;
4. the history of the child in society;
5. a comparative study of Montessori and other environments for young children; and
6. an introduction to research procedures sufficient for the measurement of interactions within the teaching/learning environment and adequate to acquaint the trainee with procedures for obtaining and evaluating current research findings as they relate to the effective implementation of the Montessori Method.

Didactic materials. The Montessori teacher trainee should demonstrate competency in the manipulation and demonstration for children of the didactic materials and a knowledge of their intent. Development of this consistency should be facilitated by utilization of such resources as peer feedback and self-evaluation of video-taped performances. The author believes that a saving of time that could be more effectively spent would be the result of having all exercises for the didactic materials printed for the trainee to read. (This might also result in greater consistency within the practiced method.) After having read the printed matter, the trainee could be exposed to a live model who would demonstrate the manipulation

of the equipment. The trainee could then practice and be given feedback on the quality of his/her performance.

Personal communication skills. In compliance with requirements based on Montessori's astute observations about and subsequent empirical validation of the successfulness of the artfully seductive teacher, each Montessori training program should include a course in efficient and effective communication through development of communication skills in trainee's use of eye contact; voice tone, pitch, and content; and body posture and movement. This training also should be facilitated by use of symbolic and live models and opportunities to rehearse and receive helpful cueing and constructive feedback for re-rehearsal. This process should be followed through in the permanent teaching environment with the help of administrators, peers, and children.

Techniques for successful Montessori observers and transformers of behavior. The Montessori teacher trainee should be introduced to the principles of Social Learning Theory as they apply to the model/observer interactions of the Montessori environment. Here, again, the trainee must learn to continually evaluate the implications of the new additions to this body of research. This study would provide the theoretical background for understanding and applying the skills necessary for effective management of contingencies to provide their students with an environment which fosters the freedom and spontaneity which Montessori mandated.

Teacher trainees should learn the skills of behavioral assessment and goal-setting. They should learn how to model and shape behavior, facilitate practice with appropriate cueing and constructive feedback, and how to successfully consequate behavior to attain identified goals. Information about the effective use of token economy systems and behavioral (contingency) contracting should also be a part of the trainee's course of study.

References

Ahlfeld, K. The Montessori revival: How far will it go. Nation's Schools and Colleges. January, 1970, 85(1), 75-78, 80.

Allen, M. K., & Liebert, R. M. Effects of live and symbolic deviant modeling cues on adoption of a previously learned standard. Journal of Personality and Social Psychology, 1969, 11, 253-260.

Ault, R. L. Children's cognitive development. New York: Oxford University Press, 1977.

Austin, G. R. Early childhood education: An international perspective. New York: Academic Press, 1976.

Baines, M. R., & Snortum, J. R. A time-sampling analysis of Montessori versus traditional classroom interaction. Journal of Educational Research. March, 1973, 66(7), 313-316.

Ball, T. S., & Campbell, M. L. Effect of Montessori's Cylinder Block training on the acquisition of conservation. Developmental Psychology, 1970, 2(1), 156.

Bandura, A. Influence of model's reinforcement contingencies on the acquisition of imitative responses. Journal of Personality and Social Psychology, 1965, 1, 589-595.

Bandura, A. Principles of behavior modification. New York: Holt, Rinehart and Winston, Inc., 1969.

Bandura, A. Social learning theory. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1977.

Bandura, A. The self-system in reciprocal determinism. American Psychologist, April, 1978, 344-358.

Bandura, A., & Barab, P. G. Conditions governing nonreinforced imitation. Developmental Psychology, 1971, 5, 244-255.

Bandura, A., Grusec, J. E., & Menlove, F. L. Some social determinants of self-monitoring reinforcement systems. Journal of Personality and Social Psychology, 1967, 5, 449-455.

Bandura, A., & Jeffrey, R. W. Role of symbolic coding and rehearsal processes in observational learning. Journal of Personality and Social Psychology, 1973, 26, 122-130.

Bandura, A., & Rosenthal, T. L. Vicarious classical conditioning as a function of arousal level. Journal of Personality and Social Psychology, 1966, 3, 54-62.

Bandura, A., & Walters, R. H. Social learning and personality development. New York: Holt, Rinehart, and Winston, 1965.

Bandura, A., & Whalen, C. K. The influence of antecedent reinforcment and divergent modeling cues on patterns of self-reward. Journal of Personality and Social Psychology, 1966, 3, 373-382.

Barnett, R. M. Let out the sunshine. Aurora, Illinois: Regina M. Barnett, Calumet at Downer, Aurora, Illinois, 60506, 1974.

Barnwell, A. K. Potency of modeling cues in imitation and vicarious reinforcement activities. Dissertation Abstracts, 1966, 26, 7444.

Baron, A., Kaufman, A., & Stauber, K. A. Effects of instruction and reinforcement-feedback on human operant behavior maintained by fixed-interval reinforcement. Journal of the Experimental Analysis of Behavior, 1969, 12, 701-712.

Bereiter, C., & Engelmann, S. The effectiveness of direct verbal instruction on IQ performance and achievement in reading and arithmetic. U. S. Office of Health, Education, and Welfare, No. PS0020200. Office of Education, 1966.

Berger, S. M. Observer perseverance as related to a model's success. Journal of Personality and Social Psychology, 1971, 19, 341-350.

Bloom, B. S. Stability and change in human characteristics. New York: John Wiley and Sons, Inc., 1964.

Bloom, L., Hood, L., & Lightbown, P. Imitation in language and development. If, when, and why. Cognitive Psychology, 1974, 6, 380-420.

Boyd, W. From Locke to Montessori: A critical account of the Montessori point of view. London: Goerge G. Harrap and Co., 1914.

Brainerd, C. J. Cognitive development and concept learning: An interpretive review. Psychological Bulletin, 1977, 84(5), 919-939.

Braun, S. J. Nursery education for disadvantaged children: An historical review. Montessori in perspective, Washington, D. C.: National Association for the Education of Young Children, 1971, 7-24.

Calder, B. J., & Straw, B. M. Self-perception of intrinsic and extrinsic motivation. Journal of Personality and Social Psychology, 1975, 31, 599-605.

California State Department of Education. Early childhood education: Report of the task force on early childhood education, Sacramento, 1972.

Calvert, P. A. A comparative study of characteristics of Montessori teachers certified by three Montessori training programs (Doctoral dissertation, Memphis State University, 1977). (University Microfilms No. 77-28, 787).

Cartwright, D. S. A competing social learning theory of personality: Bandura and Walters. Theories and models of personality. Dubuque: Wm. C. Brown Company, 1979, 502-523.

Coates, B., & Hartup, W. W. Age and verbalization in observational learning. Developmental Psychology, 1969, 1, 556-562.

Cole, L. Montessori and her schools. A history of education: Socrates to Montessori. New York: Holt, Rinehart, & Winston, 1950, 563-590.

Coombs, R. H., Eckman, T. A., Santana, F. O., & Swenson, E. W. Strengthening families: A social learning approach to youth problems. San Francisco: Jossey-Bass Publishing Co. In press.

Culverwell, E. P. The Montessori principles and practice. London: G. Bell and Sons, Ltd., 1913.

Edmonson, B. Let's do more than look--let's research Montessori. Montessori in perspective. Washington, D. C.: National Association for the Education of Young Children, 1971, 66-77.

Elkind, D. Child development and education: A Piagetian perspective. New York: Oxford University Press, 1976.

Estes, W. K. Reinforcement in human behavior. American Scientist, 1972, 60, 723-729.

Evans, E. D. Contemporary influences in early childhood education. New York: Holt, Rinehart, & Winston, Inc., 1971.

Feingold, B. D. & Mahoney, M. J. Reinforcing effects on intrinsic interest: Undermining the overjustification hypothesis. Behavior Therapy, 1975, 6, 367-377.

Fisher, D. C. The Montessori manual for teachers and parents. Cambridge, Massachusetts: Robert Bentley, Inc., 1964.

Flanders, J. P. A review of research on imitative behavior. Psychological Bulletin, 1968, 69, 316-337.

Geiwitz, J., & Moursund, J. Follow the leader: Modeling and imitation. Approaches to personality: An introduction to people. Monterey, California: Brooks/Cole Publishing Company, 1979.

Hainstock, E. The essential Montessori. New York: New American Library, 1978.

Hainstock, E. Teaching Montessori in the home: The preschool years. New York: New American Library, 1976.

Hennings, J. S., Kornreich, S. J., & Berell, L. A developmental study of the effects of pretraining on a perceptual recognition task. Child Development, December, 1971, 42(6), 2117-2119.

Hildebrant, D. E., Feldman, S. E., & Ditrichs, R. A. Rules, models, and self-reinforcement in children. Journal of Personality and Social Psychology, 1973, 25, 1-5.

Homme, L., & Tosti, D. Behavior technology: Motivation and contingency management. San Rafael, California: Individual Learning Systems, Inc., 1971.

Hunt, J. McV. Intelligence and experience. New York: The Ronald Press Co., 1961.

Hunt, J. McV. Introduction: Revisiting Montessori. The Montessori Method. Maria Montessori. New York: Schocken Books, 1964.

Jennings, C. L. Children in the United States. Family Economics Review Highlights, Winter 1979, 17-20. Consumer & Food Economics Institute, Science & Education Administration, U. S. Department of Agriculture.

Kennedy, T. D. Verbal conditioning without awareness: the use of programmed reinforcement and recurring assessment of awareness. Journal of Experimental Psychology, 1970, 84, 487-494.

Kennedy, T. D. Reinforcement frequency, task characteristics, and interval of awareness assessment as factors in verbal conditioning without awareness. Journal of Experimental Psychology, 1971, 88, 103-112.

Kilpatrick, W. H. The Montessori system examined. Boston: Houghton Mifflin, 1914.

Klein, R. P. Multivariate comparison of two model preschool programs. Paper presented at the August, 1973, convention of the International Society for the Study of Behavioral Development. Available from the author at Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health, Bldg. 31, Room B2B15, Bethesda, Maryland.

Kramer, R. Maria Montessori. New York: G. P. Putnam's Sons, 1976.

Lepper, M. R., & Greene, D. Turning play into work: Effects of adult surveillance and extrinsic rewards on children's intrinsic motivation. Journal of Personality and Social Psychology, 1975, 31, 479-486.

Lepper, M. R., Greene, D., & Nisbett, R. E. Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis. Journal of Personality and Social Psychology, 1973, 28, 129-137.

Lillard, P. P. Montessori: A modern approach. New York: Schocken Press, 1973.

McDermott, J. J. Introduction to Spontaneous activity in education, Maria Montessori. New York: Schocken Books, 1965.

McMains, M. J., & Liebert, R. M. Influence of discrepancies between successively modeled self-reward criteria on the adoption of a self-imposed standard. Journal of Personality and Social Psychology, 1968, 8, 166-171.

Montessori, Maria. Pedagogical anthropology. London: William Heinemann, 1913.

Montessori, Maria. Education for a new world. Madras, India: Kalakshetra Publications, 1963.

Montessori, Maria. The Montessori Method. New York: Schocken Books, 1964.

Montessori, Maria. Dr. Montessori's Own Handbook. New York: Schocken Books, 1965a.

Montessori, Maria. Spontaneous Activity in education. New York: Schocken Books, 1965b.

Montessori, Maria. The secret of childhood. New York: Ballantine Books, 1966.

Montessori, Maria. The absorbent mind. New York: Dell Publishing Co., 1967a.

Montessori, Maria. To educate the human potential. Madras, India: Kalakshetra Publications, 1967b.

Montessori, Maria. From childhood to adolescence. New York: Schocken Books, 1973.

Montessori, Maria. The discovery of the child. New York: Ballantine Books, 1974.

Montessori, Mario M., Jr. Education for human development: Understanding Montessori. New York: Schocken Books, 1977.

National Center for Montessori Education. The National Montessori Reporter. Washington, D. C., September, 1978.

National Center for Montessori Education. The National Montessori Reporter. Washington, D. C., February, 1979.

Nelson, G. A teacher's bag of tricks. Creve Coeur, Missouri: Edgar Nelson, 726 Decker Lane, Creve Coeur, Missouri, 1978.

Nienhuis Montessori U.S.A., Inc. Nienhuis Montessori Catalog. Mountain View, California, 1979.

Nolan, J. Children's services. California Association for the Education of Young Children Newsletter, March, 1979, 7(2), 2.

Nunn, T. P. Education: Its data and first principles. London: Edward Arnold and Co., 1923.

Orem, R. C. Montessori: Her method and the movement: What you need to know. New York: G. P. Putnam's Sons, 1974.

Orem, R. C. Montessori today. New York: Capricorn Books, 1972.

Parker, R. K. A review and critique of daycare and early childhood curricula. Cassette tape. Child Care and Information Center, 532 Settlers Landing Road, Hampton, Virginia, 23669, 1975.

Plank, E. N. Reflections on the revival of the Montessori Method. Montessori in perspective. Washington, D. C.: National Association for the Education of Young Children, 1971, 43-48.

Postman, L., & Sassenrath, J. The automatic action of verbal rewards and punishments. Journal of General Psychology, 1961, 65, 109-136.

Rambusch, N. McC. Introduction to Dr. Montessori's own handbook. New York: Schocken Books, 1965.

Reese, E. P. Human behavior: Analysis and application. Dubuque, Iowa: Wm. C. Brown Co., 1978.

Rosenstein, J. C., & Swenson, E. W. Behavioral approaches to the aging. In S. S. Sargent (Ed.), Psychotherapy and counseling with the aging--nontraditional approaches. New York: Springer Publishing Co. In press.

Ross, M. Salience of reward and intrinsic motivation. Journal of Personality and Social Psychology, 1975, 32, 245-254.

Sarason, I. G., Glaser, E. M., & Fargo, G. A. Reinforcing productive classroom behavior. New York: Behavioral Publications, Inc., 1972.

Schill, B., & Omwake, E. The Montessori system. Montessori in perspective. Washington, D. C.: National Association for the Education of Young Children, 1971, 31-37.

Schwitzgebel, R. K., & Kolb, D. A. Changing human behavior: Principles of planned intervention. International Student Edition. Tokyo: McGraw Hill Kogakusha, Ltd., 1974.

Snitzer, H. Today is for children: Numbers can wait. New York: Macmillan Co., 1972.

Standing, E. M. The Montessori revolution in education. New York: Schocken Books, 1966.

Stouwie, R. J., Hetherington, E. M., & Parke, R. D. Some determinants of children's self-reward behavior after exposure to discrepant reward criteria. Developmental Psychology, 1970, 3, 313-319.

White, Burton. The first three years of life. New York: Avon Publishing Co., 1975.

Yussen, S. R. Determinants of visual attention and recall in observational learning by preschoolers and second graders. Developmental Psychology. 1974, 10, 93-100.

Reference Notes

1. Montessori, Maria. A letter addressed to all governments in 1947. Published in News. Association Montessori Internationale, U.S.A., Winter, 1978-79.

2. Claremont, C. Personal communication to a Montessori teacher trainer. Passed on to students in a lecture, November, 1976.

3. Rosenstein, J. C. Personal communication, November, 1978.

4. Hunt, D. E. A conceptual systems change model and its application to education. Draft. Syracuse University, February, 1964.

5. Scheffler, K. Personal communication, May 1, 1979.

6. Brophy, J. E., & Choquette, J. J. Divergent production in Montessori children. Paper presented at the biennial meeting of the Society for Research in Child Development. Philadelphia, March 29-April 1, 1973.

7. Clement, P. Self-administered behavior therapy for children. Paper presented at the Tenth Annual Southern California Conference on Behavior Modification, Los Angeles, February, 1979.

8. Hosford, R. E. Self-observation and self-modeling strategies for behavior change. Paper presented at the Tenth Annual Southern California Conference on Behavior Modification, Los Angeles, February, 1979.

9. Hosford, R. E. A review of observational learning counseling strategies: Modeling, self-observation and self-as-a-model. Unpublished manuscript. University of California Santa Barbara, 1979.

10. Meichenbaum, D. Cognitive behavior modification: The critical issues and future directions. Paper presented at the Tenth Annual Southern California Conference on Beavior Modification, Los Angeles, February, 1979.

11. Behavior Analysis and Modification in Community Mental Health Centers Project. NIMH Research Grant No. 1R01MH 19880-0181, Mental Health Services Research and Development Branch.

APPENDIX A

Glossary of Terms

behavior - any observable, therefore recordable, action.

behavioral assessment - identifying specified behaviors in operational terms.

behavior modification - the intentional systematic change of behavior by application of established principles of human behavior.

cue - an external or symbolic stimulus that sets the occasion for a response or a set of responses.

freedom - the number of options available to an individual and the right to exercise them.

goal-setting - determining and stating specific behavior objectives.

instructions - specific directions, prompts, and cues that will facilitate performance of a specifid behavior.

modeling - demonstrating appropriate behaviors.

negative reinforcer - removal of a negative consequence which results in strengthening the response which preceded it; may also be the removal of a negative consequence unrelated to a specified beheavior, the removal of which facilitates the specified behavior.

punisher - an unpleasant consequence which diminishes the strength and frequency of the response which preceded it.

punishment - an aversive stimulus or consequence which decreases the strength of an undesired response.

rehearsal - guided practice of a model's behavior.

reinforcement - the act of administering reinforcers.

reinforcer - a positive consequence which strengthens the response which preceded it.

schedules of reinforcement - one of seven patterns of frequency with which a response is reinforced.

1. fixed-interval schedule: Reinforcement is administered for the first correct response made after a predetermined specified time lapse.
2. fixed-ratio schedule: Reinforcement is given after a predetermined specified number of correct responses.
3. variable-interval schedule: Reinforcement is given for the first correct response after a variable time interval.
4. variable-ratio schedule: Reinforcement is given after a variable number of correct responses.
5. intermittent schedule: Reinforcement is not administered on any of the above-described schedules but does follow some correct responses.
6. continuous schedule: Reinforcement is given after every correct response.
7. extinction schedule: Reinforcement is withheld for a specified response.

shaping - providing positive consequences for designated goal-directed increments of behavior.

stimulus - anything to which an individual responds.

token economy - a system of behavior modification in which tokens are used as reinforcers.

vicarious learning - learning by observation of the behavior of a model and the consequences to the model for such behavior.

vicarious reinforcement - reward or punishment to a model which influences the learning of an observer.

APPENDIX B

A LISTING OF MONTESSORI EXERCISES AND THEIR AIMS FOR THE CURRICULUM AREAS OF PRACTICAL LIFE, SENSORIAL, MATHEMATICS, AND LANGUAGE FOR CHILDREN 2½-8

PRACTICAL LIFE EXERCISES

Rolling a Rug

Carrying Apparatus

Carrying a Chair

Carrying a Table

Sitting at a Table

Walking on a Line

The Silence Game

Sorting

Dry Pouring

Spooning

Liquid Pouring

Sponge Squeezing

Cleaning up a Spill

Basting

Fabric Folding

Use of Scissors

Bread Grating

Orange Juice Squeezing

Carrot Cutting

Blowing the Nose

Button Frame

Snap Frame

Hook and Eye Frame

Zipper Frame

Buckle Frame

Pin Frame

Bow Tieing Frame

Packing a Suitcase

Shoe Polishing

Hand Washing

Grace and Courtesy

Opening and Closing a Door

Hanging up a Coat

Wrapping a Package

Dusting

Care of a Book

Crumbing

Flower Arranging

Polishing a Mirror

Table Polishing

Sweeping

Mopping

Silver Polishing

Table Washing

Clothes Washing

AIMS OF THE PRACTICAL LIFE EXERCISES

development of language

control of movement

coordination

grace

motivation for activity

concentration

lengthening of attention span

development of eye/hand and muscle coordination

development of kinesthetic sense

development of independence and social responsibility

emphasis of cause and effect

care of the environment

care of the self

learning a specific skill

balance

large muscle control

development of body image

consideration of others

appreciation of nature

self-worth through achievement

a sense of sequential process and order

visual and tactile discrimination

sense of order

attention to detail

manipulative dexterity

direct and indirect preparation for more advanced tasks, reading, and writing

SENSORIAL EXERCISES

Cylinder Blocks

Knobless Cylinders

Pink Tower

Broad Stair

Red Rods

Color Tablets

Fabric Feeling

Tasting Bottles

Thermic Bottles

Thermic Tablets

Baric Tablets

Sound Boxes

The Bells

Mystery Bag

Rough and Smooth Boards

Rough and Smooth Touch Tablets

Smelling Bottles

Geometric Cabinet and Cards

Geometric Solids

Constructive Triangles

Binomial Cube

Trinomial Cube

AIMS OF THE SENSORIAL EXERCISES

attention to detail

eye/hand coordination

development of visual and stereognostic senses

discrimination of gradations of size, length: in a series

coordination and control of movement

fine motor control

development of concentration and attention span

indirect preparation for math

visual discrimination of color

indirect development of aesthetic sense

visual discrimination: awareness of three-dimensional objects in the environment and their relationship to each other

development of the chromatic sense

development of the tactile sense

ability to observe, collect and process data and make judgments

increase of perceptive awareness of the environment

appreciation of the beauty inherent in texture

development of language

gustatory sense refinement

thermic sense refinement

development of a sense of order

refinement of the auditory sense

preparation for music

awareness of music tones

awareness that things exist when not visible

concepts of rough/smooth

refinement of the olfactory sense

development of the ability to understand abstractions

development of memory

knowledge of geometric planes and solid figures

understanding the triangle as a constructor of geometric plane figures

indirect preparation for geometry and algebra

indirect development of appreciation of form and line

LANGUAGE EXERCISES

Vocabulary Enrichment

Sandpaper Letters

Wall Charts

Metal Insets

Montessori Designs for Coloring

Movable Alphabet

Phonetic Object Boxes

Programmed Reading Material - Level 1

Programmed Reading Material - Level 2

Phonetic Word Cards

Phonetic Baskets

Phonetic Command Cards

Phonetic Reading Booklets

Phonogram Object Box

Programmed Reading Material - Level 3

Eighteen Baskets

Phonogram Word Booklets

Phonogram Word Lists

Sentence Strips

Phonogram Stories

Philip and Tacey Word Cards

Galsworthy Booklets

Montessori Reading Booklets

Printed Alphabet

Pre-and Suffixes

Compound Words

Puzzle Words

Non-Phonetic Command Cards

Reading Comprehension - Practice I

Reading Comprehension - Practice II

Reading Comprehension - Practice III

Reading Comprehension - Practice IV

Parts of Speech

- First Noun Game
- Second Noun Game
- First Verb Game
- Second Verb Game
- Noun Symbol
- Article
- Adjective
- Logical Agreement Game - Adjective
- Detective Game - Adjective
- Numerical Game - Adjective
- Verb Symbol
- Adverb
- Logical Adverb Game
- Conjunction
- Preposition
- Pronoun
- Interjection

Singular/Plural

Gender Games

Grammar Boxes

AIMS OF THE LANGUAGE EXERCISES

preparation for reading

preparation for writing

preparation for spelling

introduction to sounds and their symbols

tactile, fine, and gross motor control and auditory and visual training

development of the kinesthetic sense and the muscular memory of letters

the development of the awareness of the sounds in words

attention to detail

reinforcement of rapid recognition of sounds and symbols

development of the memory of sounds and symbols

learning to hold a pencil

eye/hand coordination

preparation for art

appreciation of line and color

preparation for study of geometric figures

preparation for study of area

development of appreciation for spatial relationships

introduction to spelling and reading

preparation for forming words

visual recognition of the form of letters

auditory discrimination of sounds of words for spelling

understanding vowels and consonants

reading words

acquaintance with the fact that words represent concrete objects and that each object has a name

preparation for grammar

visual memory of simple words

practice with phonetic sounds

practice with reading words of increasing length

introduction to consonant blends, double consonants, y as e

introduction to non-phonetic blends

indirect preparation for drama

experiencing the meaning of words

practice with phonogram sounds

practice in writing words

building vocabulary

preparation for spelling

facilitation of self- (and creative) expression

introduction to sentence form and construction

preparation for composition

reinforcement and expansion of early experiences in the Montessori environment

introduction to etymology

spelling and pronunciation of irregular words

preparation for future word acquisition

reading comprehension

building of sight vocabulary

practice in reading

practice in sentence construction

learning the nomenclature of biological, geometric, geographic, or other scientific disciplines

learning the parts of speech

understanding the functions of words

preparation for further acquisition of grammar

analysis of language

MATHEMATICS EXERCISES

Number Rods

Sandpaper Numerals

Number Rods and Cards

Spindle Boxes

Cards and Counters

Memory Game

Golden Bead Material

Introduction to Decimal Cards

Association of Beads and Decimal Cards

Formation of Numbers

The Change Game

Addition Bank Game

Subtraction Bank Game

Multiplication Bank Game

Division Bank Game

Teen Board--Beads

Teen Board--Board

Teen Board--Association

Ten Board--Beads

Ten Board--Board

Ten Board--Association

100 and 1000 Chains

100 Board

Short Bead Chains

Long Bead Chains

Strip Board of Addition

Addition with Number Rods

Addition--Small Bead Frame

Addition--Charts

Subtraction Strip Board

Subtraction--Small Bead Frame

Subtraction--Charts

Addition Stamp Game

Subtraction Stamp Game

Positive Snake Game

Negative Snake Game

Dot Game

Multiplication Stamp Game

Multiplication Board

Multiplication Bead Bar Layout

Multiplication--Large Bead Frame

Multiplication--Charts

Multiplication--Checkerboard

Short Division Stamp Game

Long Division Stamp Game

Unit Division Board

Long Division--Division Boards

Division--Charts

Long Division with Bows

Division--Square Root Board

AIMS OF MATHEMATICS EXERCISES

learning quantities of numbers 1 through 10

developing a concept of quantity

indirect preparation for understanding the sequence of numbers

names of the numbers 1 through 10

association of names with quantities

forming connections between spoken numbers and symbols

preparation for writing numbers

growth in concentration

association of written symbol and concrete quantity

introduction to number as expressed by loose quantity

introduction to zero

practice with number sequence

learning correct spatial orientation of numerical symbols

working with correct sequencing of numbers

exposure to a concrete representation of loose odd and even quantities

experiencing a method for ordering loose quantity

learning the concept of pair

making pairs

retention of numbers (memory)

visually and stereognostically perceiving the quantities of one unit, one ten, one hundred, and one thousand

learning the names of place values of the decimal system

further comprehension of the decimal system and understanding of place value; comprehension of relative size between categories

to learn the numerical symbols that correspond with the materialized quantities of the decimal system

to learn the printed numerical symbols for numbers from 1 to 1000

preparation for the formation of numbers

further abstraction in learning place values

reinforcement of the understanding of place value

preparation for using the decimal material in the four mathematical operations

further comprehension of categories of numbers and reading of symbols

understanding the zero as holder of an empty space when one place category is lacking

understanding of the concept that only nine numbers exist in each category, plus zero, and that this is sufficient to form any number

introduction of the concept of carrying from one hierarchy to another

to provide a concrete representation of addition within the framework of the decimal system

further understanding of carrying

to provide a concrete representation of subtraction within the framework of the decimal system

understanding of borrowing

to provide a concrete representation of multiplication within the framework of the decimal system

understanding the concept of multiplication: taking a number n times

to provide a concrete representation of division within the framework of the decimal system

further understanding of exchange from higher to lower categories

introduction to the names of the teens

association of numbers and color-coded bead stair

reinforcement of concept of place value

recognition of symbols 11 - 19

association of the quantity of teens with corresponding symbols

introduction to and learning the names of the tens

learning symbols 10 - 90

reinforcement of place value concept

learning sequence of tens

learning quantities 20 - 99

learning names of numbers and numerical order of teens and tens

learning to relate symbols to quantities, 20 - 99

familiarity with the sequence of numbers to 1000

acquisition of the mechanics for counting

preparation for squaring and cubing

preparation for area and volume

reinforcement of linear counting

introduction to the square of a number

counting and reading numbers correctly

memorization of addition tables

preparation for further abstractions of addition

development of concept of adding two numbers to form a new number

further abstraction of addition

development of greater understanding of carrying

learning addition tables

practice in using charts

preparation for multiplication

practice in working with subtraction tables

reinforcing concept of subtraction

further abstraction of subtraction

developing further understanding of borrowing

further practice with subtraction problems

learning subtraction facts

practice in using charts

understanding addition in more abstract form

understanding subtraction in more abstract form

practice in addition, especially combinations of ten

further abstraction of subtraction

indirect preparation for negatives and the algebraic concept of positive and negative of the same number equaling zero

further abstraction of the decimal system and zero

further comprehension of carrying

understanding multiplication in more abstract form

practice with multiplication tables

understanding basic multiplication equations

seeing the commutative property of multiplication

indirect preparation for concept of division where there is equal sharing

further understanding of multiplication tables

memorization of multiplication tables

preparation for multiplication in more abstract form

further comprehension of function of multiplication

practice with division

preparation for long division

abstraction of division

understanding long division

preparation for division tables

further understanding of division and place value in the decimal system

comprehension of division tables

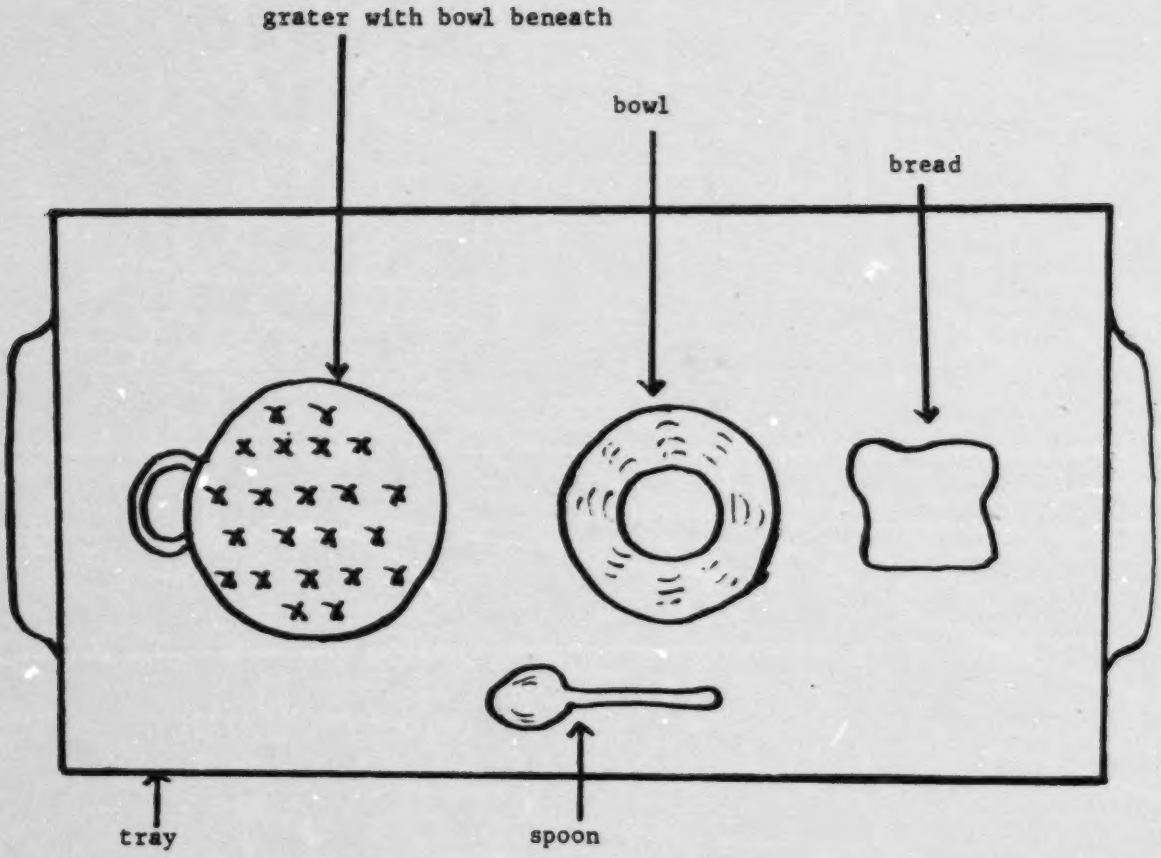
practice in notation of division problems

practice in concrete representation of long division

further understanding of division

APPENDIX C

BREAD GRATING, A PRACTICAL LIFE EXERCISE



BREAD GRATING

an individual/group activity
ages: 3 - 5½
area: table

category — Coordination and control of movement

prerequisites — "Crumbing"
"Spooning"
"Sponging"

materials — All materials should be color-coordinated. A plastic bread grater, about 8" in diameter which sits over a bowl which catches the crumbs. A small bowl, a tray, a spoon, a supply of dry bread stored in a bowl or basket on shelf near where exercise is kept. Extra container for leftover bread.

presentation — Invite a child.

"Please come with me. I have something very special for you."

Go to the shelf where the exercise is kept.

"This is bread grating. Can you say 'bread grating'?"

Take the tray to the child's table and then go back for bread. Or bread may be placed on tray before going to table. The former may be preferable for a more active child. Seat yourself to child's right.

Hold left handle of grater with 3fg[1] of

[1] Three finger grip (as used in holding a pencil).

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sdh.[2,*3] Hold bread in dh,[4] thumb on top.* Grate across surface in left to right motion, slowly and carefully, taking care that the bread does not crumble or break.* Repeat motion until near end of bread.

"Let's stop so that we don't hurt our fingers."

Place leftover bread pieces in a container.*

Remove grater lid. Place perpendicular to bowl and tap handle a few times to dislodge crumbs.* Place grater lid on table. Place spoon in dh. Gather all crumbs toward you in a top to bottom, left to right motion.* Spoon into smaller bowl as described in "Spooning".

"See the crumbs?"

"We will clean up first. Then we will feed the birds."

Take the bowl containing the bread to a safe place. Replace the grater, bowl, and spoon on tray.

"Let's put this in a safe place."
"Let's take this to the sink."

Carry tray to sink area by trash can. Clean equipment by using a sponge as in "Sponging". Replace materials in correct order on tray. Show child where supply of clean bowls is kept to replace the bowl now holding his crumbs.

"If you will come with me I will show you where the clean bowls are kept. We will place a clean bowl on the tray so that another child may do the exercise."

---

[2]Sub-dominant hand

[3]Eye contact

[4]Dominant hand

Return the exercise to the shelf.
Crumb table as described in "Crumbing".

"Let's see if we need to clean your table."

"Now we are ready to feed the birds."

"Let's clean out the crumb bowl now."

Offer the child a turn by himself after the birds have been fed and the bowl cleaned at the sink and restored to the clean bowl shelf.

"Would you like a turn to grate some bread and feed the birds all by yourself?"

points of interst

1. Hearing noise as bread is grated.
2. Seeing crumbs appear and bread diminish in size.
3. Stopping when bread has become very small.
4. Seeing where clean bowls are kept.
5. Feeding the birds.
6. Seeing crumb bowl cleaned and returned to shelf where clean bowls are kept.

controls of error

1. Seeing crumbs spill while grating.
2. Feeling grater blades with fingertips.
3. Seeing bread crumble or break.

4. Seeing crumbs remaining in large bowl after spooning.

5. Seeing crumbs on tray or table after completion of exercise.

aims

1. Provides a motive for activity.

2. Development of control of movement and coordination.

3. Development of concentration and lengthening of attention span.

4. Care of environment.

5. Development of independence.

6. Learning consideration for other creatures.

7. Indirect preparation for handwriting.

variations

1. Grating carrots, cheese, chocolate or other hard material.

2. Using different sized graters.

extensions

1. Grating used as part of a recipe such as crumb crust or crumb casserole topping, cheese and onions for tacos, etc.

2. Making cole-slaw.

3. Grating wax or crayons for art projects.

4. Using a metal grater.

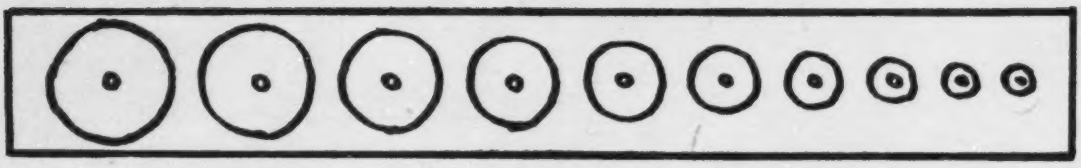
5. Using a carrot scraper (potato peeler).

APPENDIX D

THE CYLINDER BLOCKS (KNOBBED CYLINDERS)
A SENSORIAL EXERCISE

KNOBBED CYLINDERS

single cylinder



Top level of Cylinder Block

Side view of Cylinder Block

KNOBBED CYLINDERS

an individual activity
ages: 2½ - 5
area: table

INSTRUCTIONS TO TEACHER

category Visual and stereognostic senses

prerequisites Basic Practical Life exercises which employ 3fg.

materials Four wooden blocks containing ten knobbed cylinders each. Each cylinder fits into its socket in the given block.

Block 1

The cylinders vary in three dimensions: height, width, depth. Each cylinder increases or decreases by half a centimeter in all dimensions. The tallest is also the thickest.

Block 2

The cylinders vary in three dimensions: height, width, depth. There is an inverse relationship between the width and depth and the height. As the width and depth increase, the height decreases.

Block 3

The cylinders vary in two dimensions: width and depth. They remain the same height while increasing in thickness by half a centimeter.

Block 4

The cylinders vary in one dimension only--height. Diameter remains the same. Height varies by half a centimeter from one cylinder to the next.

INSTRUCTIONS TO CHILD: A SHAPING PROCEDURE		INSTRUCTIONS
presentation	Invite the child to come with you. Go to the area where the sensory materials are kept.	"Please come with me. I have something special to show you."
Sequential Order	Locate Block 1 of the Knobbed Cylinders. Show the child how to hold the block, one hand at each end, thumbs toward the body, fingers away, at about waist height. Carry the block to the table and set yourself to the child's right. Position block on table so that the largest cylinder is to the left. Using 3fg of right hand, slowly remove the largest cylinder from the block and place it on the table directly in front of its socket quietly.* Repeat motion for each cylinder in sequence.* Using 3fg of left hand, pick up first cylinder on left. With index and middle fingers of right hand trace around circumference of cylinder in a clockwise direction (starting at about 11:00). Place cylinder on table in front of socket. With same two fingers, trace circumference of socket in clockwise direction. With 3fg of right hand pick up cylinder and center over socket * then lower into socket as quietly as possible.	"This is a Cylinder Block. "This is how to hold it."
		CUEING
		"Do you hear any noise?"

Repeat with remaining cylinders in sequential order. When all cylinders have been replaced, take index and middle fingers of right hand and lightly trace along the top of the cylinders (not the knobs) to be certain that they are flush with the top of the block.

PRACTICE

PRACTICE

Offer the child a turn.

"Would you like to work the Cylinder Block?"

Return the Cylinder Block to the shelf.

Random Order

This may be presented at the same sitting or on a subsequent occasion, depending on the ability and attention span of the child

Cylinders are removed sequentially but placed in random order on the table. Scanning the cylinders visually (you may emphasize the scanning with your finger), look for the largest cylinder. Continue as in first presentation, always selecting the largest. Check to see that cylinder tops are resting flush with top of block.

CUEING

"I am looking for the largest cylinder."

Blocks 2, 3, 4

Presented in sequence as described above. (It may not be necessary to do a formal presentation of all four Cylinder Blocks.)

CUES AND FEEDBACK

points of interest

1. Holding knobs of cylinders in 3fg.
2. Seeing empty socket after each cylinder is removed.

3. Holding the cylinder in 3fg of left hand and tracing circumference with index and middle fingers of right hand.

4. Tracing circumference of socket with right hand.

5. Holding cylinder over the socket and pausing, then slowly lowering it into place.

6. Feeling that the top of the cylinders fit flush against the block.

CUES AND FEEDBACK

controls of error

1. Seeing a cylinder without a socket or a socket without a cylinder.

2. Seeing or feeling that the tops of the cylinders are either higher or lower than the top of the block.

3. Before lowering cylinder into socket, seeing that it will not fit.

4. Seeing that the cylinder will wiggle noisily in the socket.

5. Hearing noise while handling cylinders.

aims

1. Development of visual discrimination of size and gradation in a series.

2. Development of eye/hand coordination.

3. Development of concentration and lengthening of attention span.

4. Indirect aims: preparation for handwriting and preparation for mathematics.

PERFORMANCE

variations

1. Setting the block on its side with the cylinder knobs toward you.

2. Using more than one cylinder block at a time. With two blocks use an inverted V; with three blocks a triangle, placing cylinders in center; with four blocks a square, placing cylinders in center.

extensions

1. Putting cylinder block on child's table and removing all cylinders. Carry the cylinders or the emptied block to another part of the room.

   a. Point to socket and have child get the cylinder that fits.

   b. Show child a cylinder and have him trace it and ask him to go to block and show you which socket it will go in.

2. Working blindfolded or with eyes closed.

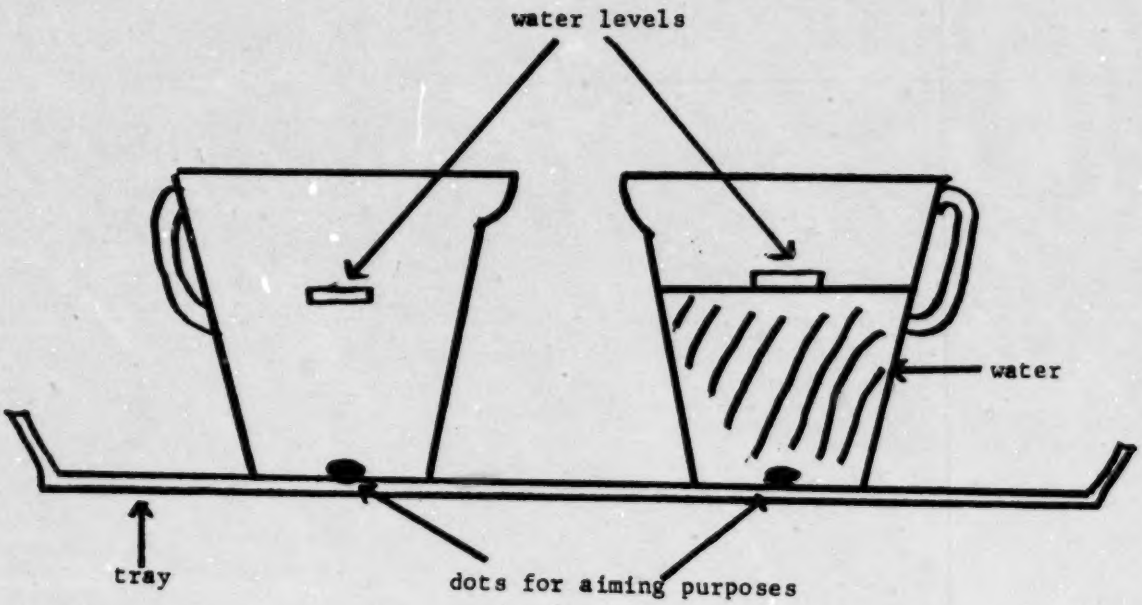
3. Correlating the knobless cylinders with the cylinder blocks.

language (use of Three Period Lesson)	Block 1	large	larger	largest
		small	smaller	smallest
	Block 2	thick	thicker	thickest
		short	shorter	shortest
		thin	thinner	thinnest
		tall	taller	tallest
	Block 3	thick	thicker	thickest
		thin	thinner	thinnest
	Block 4	tall	taller	tallest
		short	shorter	shortest

APPENDIX E

LIQUID POURING
A PRACTICAL LIFE EXERCISE

LIQUID POURING



LIQUID POURING

an individual exercise
ages: 2½ - 4
area: table

category — Motor control and coordination

prerequisites — "Dry Pouring"
"Sponge Squeezing"

materials — All materials should be color-coordinated. Two matching plastic pitchers with spouts. Tape on the sides should indicate water level. A red dot on the bottom should indicate where to aim when pouring. A tray with sloped sides; a sponge; an apron.

presentation

Invite the child to come with you. Suggest that he put an apron on.

"I have something special to show you today. Let's go and put our aprons on."

Go and get the aprons.
Go to the shelf where the exercise is kept and identify it for the child.

"This is water pouring. Can you say 'water pouring'?"

Take the exercise to the child's table. Seat yourself to the right of the child.

Pick up the left pitcher with the 3fg of sub-dominant hand on the handle. Support it under spout with dh, thumb kept low. Lift the left pitcher from the tray and move it over the right pitcher. * Aiming the spout at the red dot, slowly tilt the

	pitcher, pouring a slow, steady stream. Wait for the last drop to fall.*	"Can you see the bubbles?" "Let's wait for the last drop."
Note that right pitcher will be lifted with dh 3fg on handle and sdh supporting spout, thumb down.	Place the left pitcher back on the tray.* Lift the right pitcher as described above. Pour the water back into the left pitcher. Point to the water level line.*	"Do you see the red dot?" "Is the pitcher as full as it was?"
	Remove pitchers from tray and check to see if any water has spilled.	"Is there any water on the tray?"
	For small spills use the sponge provided on the tray. (This sponge may be removed from the tray at the beginning of the exercise and placed on the upper righthand corner of child's table.) Soak up any drops of water and wipe tray from left to right. If necessary, take sponge to sink and squeeze it.	
	Check table for spills.	"Is there any water on the table?"
	For large spills, go with child to get sponge and bucket and proceed as in "Sponge Squeezing" exercise.	
	Check to see if water is below water line. Level if necessary. (Water may be kept in a pitcher at the sink for the child's later use in "leveling".)	

Return the exercise to the shelf and offer the child a turn.

"Would you like to do water pouring now?"

Be sure the exercise is ready for the next child and that the child returns his apron.

points of interest

1. Putting on an apron.
2. Using 3fg of sdh on left pitcher handle and supporting pitcher under spout with other hand, thumb down. (Reverse procedure for right pitcher.)
3. Seeing a slow, steady stream of water land on the dot.
4. Seeing bubbles.
5. Hearing the water.
6. Waiting for the last drop to fall.
7. Seeing that all of the water is in the right pitcher and the left pitcher is empty.
8. Seeing that the tray and table are dry.
9. Seeing that the water is up to the water line.

controls of error

1. Feeling wet.
2. Holding both pitchers at the same time.
3. Seeing water on the tray or table.

4. Seeing water in both cups at the completion of the exercise.

5. Seeing that the water level is below the tape.

aims

1. Development of motor control and coordination.

2. Development of concentration and attention span.

3. Development of independence and responsibility.

4. Development of eye/hand coordination.

5. Development of sense of order.

6. Motive for activity.

7. Direct preparation for handwriting.

8. Indirect preparation for reading.

variations

1. Using various vessels such as cups, beakers, glass or crystal, handles and spouts or lacking them. Using colored or soapy water. Pouring viscuous fluids.

2. Watering plants in the classroom with a pitcher.

extensions

1. Using containers of different shapes but equal volume.

2. Pouring through a funnel.

3. Pouring from a pitcher to a basin, into a bucket, or into a sink.

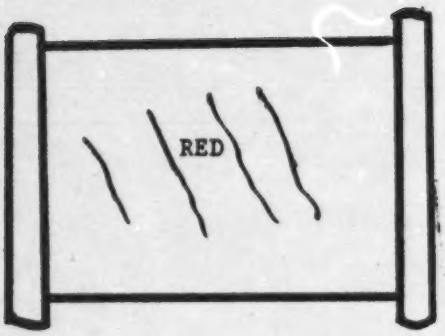
4. Pouring juice for snacks; pouring milk at lunch.

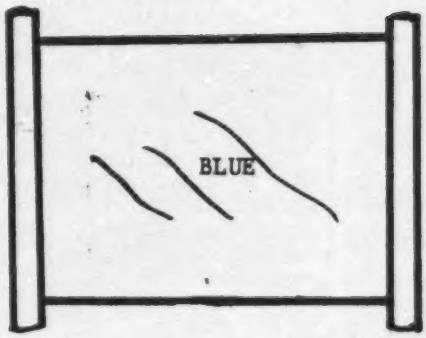
5. Watering a garden with a sprinkling can.

APPENDIX F

THE THREE PERIOD LESSON

COLOR TABLETS





THE THREE PERIOD LESSON FOR THE COLORS

RED AND BLUE

I. NAMING - This is...

Place a red color tablet and a blue color tablet on the table.
Point to the red. Point to the blue.

"This is red. Can you say red?"
"This is blue. Can you say blue?"

II. PRACTICE - Show me...

Leaving tablets in same position ask child to show you most recently named item, i.e., blue. Then first item. (Then that in middle if three-item presentation.)

"Show me blue."
"Show me red."

Change the positions of the items. Query again.

"Show me red."
"Show me blue."

or

"Give me red."
"Give me blue."

III. TEST OF KNOWLEDGE (IDENTIFICATION) - What is this...?

Point to red and say
Point to blue and say
Change positions of objects and repeat.

"What is this?"
"What is this?"

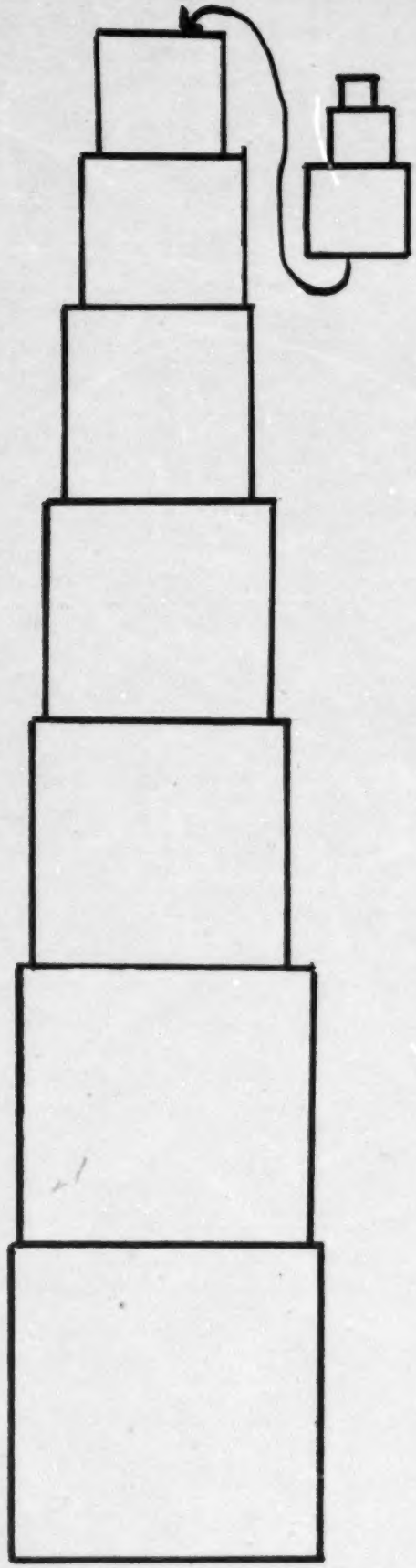
NOTE: If the child is not able to sucessfully complete the third period, go all the way back to the first period.

APPENDIX G

THE PINK TOWER
A SENSORIAL EXERCISE

PINK TOWER

Side view; about .5 actual size



PINK TOWER

an individual exercise
ages: 2½ - 5
area: rug

category — visual and tactile senses (stereognostic sense)

prerequisities — Basic Practical Life exercises and Cylinder Blocks.

materials — Ten pink wooden cubes varying directly in size. The smallest is $1cm^3$ and the largest is $10cm^3$. The smallest cube may be kept in a small box. (He is referred to as Tiny Tim — or how about "Tiny Alice?") The small box may be kept in a special place.

presentation

Invite the child to come with you to get a rug. Go to the area where the Pink Tower is kept.

"Let's go and get a rug. I have something special to show you."

"This is the Pink Tower. Can you say Pink Tower?"

Show the child how to grasp the cubes using the entire right hand spread over the top. The cube rests on the palm of the left hand. The teacher and the child may work together in carrying the cubes, one at a time, to the rug. Place the cubes randomly on the rug. When all cubes have been carried, sit down by the rug, yourself to the child's right. Bring the smallest and largest cubes together for contrast.

Begin to build a tower, using the largest cube as a base. Visually scan the cubes always looking for the largest one each time. Gently place the second largest cube on top of the tower; make no noise. Slowly and precisely place

"I am going to build a tower."

each cube on the one below, centering carefully. Point out the ledge formed around the bottom of each cube. "See the ledge?"

During the presentation, the teacher may invite the child to place some of the cubes on the tower. Have the child observe the tower from the very top down when it is completed.

Slowly remove the cubes, one at a time, and place them randomly on the rug. "Now we will take it down."

Offer the child a turn. "Would you like to build the tower?"

At the completion of the exercise return the cubes to the shelf, one at a time, beginning with the largest cube. In this way, the tower will be reconstructed on the shelf.

points of interest

1. Carrying the cubes as left hand were a tray.
2. Seeing the smallest cube next to the largest on the rug.
3. Centering each cube on the one below it and seeing a ledge formed on all four sides.
4. Seeing the tower from the top.
5. Removing the cubes one by one.
6. Seeing the tower built back on the shelf.

controls of error

1. Dropping the cubes while carrying them.
2. Seeing the tower fall over.
3. Not being able to see a ledge formed on all four sides.

4. Seeing a cube left on the rug after finishing the tower.

aims

1. Development of visual discrimination of size.
2. Development of concentration and attention to detail.
3. Development of eye/hand coordination.
4. Indirect preparation for mathematics.

variations

1. Building tower with two sides flush (smallest cube will fit on ledge and come to end of it).
2. Building tower with one side flush (ledge on three sides.)
3. Building horizontal stair on rug from largest to smallest.
4. Building from smallest to largest (using a board on the rug or building on a table).
5. Building with every other cube (using 5 cubes).
6. Building with one to one corner and the next to the opposite corner.

extensions

1. Placing cubes in various parts of the room and having child select largest each time.
2. Blindfolding the child, removing a cube; remove the blindfold and ask which cube was removed.
3. Building the tower blindfolded.

language

large	larger	largest
small	smaller	smallest

APPENDIX H

A SAMPLE STRUCTURE OF A MONTESSORI EXERCISE SHOWING CORRELATIONS WITH SOCIAL LEARNING COMPONENTS

	Exercise Component	Social Learning Component
1	Title of task For Whom Area Category	Instructions - to facilitator
2	Prerequisites	Facilitator must assess learner's retention of necessary previously-learned information
3	Materials	Cues for attention (also provided by models and facilitator)
4	Presentation	Instructions to facilitator; modeling with verbalization: instructions, cues
5	Child's turn	Rehearsal: facilitator must provide feedback; also further instructions and cues and reinforcement must be provided. It may be necessary to go back to item 4.
6	Points of interest	Self-observation and rehearsal cues provided by materials and facilitator
7	Controls of error	Feedback: self-observation, materials, and facilitator
8	Aims	Instructions to facilitator
9	Variations	Reproduction (Imitation) by learner; feedback and reinforcement by facilitator
10	Extensions	Reproduction (including Modeling) by learner; feedback and reinforcement by facilitator to learner and observer
11	Language	Steps 2 - 10

This structure is appropriate for material or social interactions.

APPENDIX I

FLOW CHART: TRAINING TECHNIQUES FOR THE MONTESSORI CLASSROOM AND MONTESSORI TEACHER TRAINING: MATERIALS AND SOCIAL INTERACTIONS (A SINGLE SEQUENCE)

	1	2	3	4	5	6	7	8
A	MODELS	MODELS SHAPES	CUES	GIVES FEEDBACK RE-MODELS	CUES	CONSEQUATES B & C	MAINTAINS B & C (CONSEQUATES)	MAINTAINS B&C (CONSEQUATES)
↓								
B	OBSERVES	OBSERVES IMITATES	REHEARSES	OBSERVES IMITATES	REHEARSES	PERFORMS	PERFORMS MODELS	SELF-CONSEQUATES*
↓								
C[1]	OBSERVES	OBSERVES	OBSERVES	OBSERVES	OBSERVES	OBSERVES IMITATES	REHEARSES	PERFORMS**

A = Facilitator

B = Observer

C = Vicarious Observer

[1]C may be more than one vicarious observer

* capable of assuming the role of A

** consequences to level 8 will determine whether C moves to A role